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I.—*An examination of the Páli Buddhistical Annals, No. 4. By the Hon'ble GEORGE TURNOUR, Esq. Ceylon Civil Service.*

### AN ANALYSIS OF THE DIPAWANSO.

The design of my last article was to prove, that the chronological authenticity of the Buddhistical records was intentionally deranged or destroyed at the period of SÁKYA's advent. In entering now upon the examination of that portion of the Páli annals, which professes to contain the genealogy of the royal dynasties of India, from the last regeneration of the world to the manifestation of GÓTAMO I have to adduce in my own case another instance, to be added to the many already on record, of the erroneous and exaggerated estimates, into which orientalists may be betrayed in their researches, when they rely on the information furnished by Indian pandits, without personally analyzing the authorities, from which that information is alleged to be obtained. I should, however, be doing the Buddhist priesthood of the present day in *Ceylon* very great injustice, if I did not at the same time avow, that the too favorable expectations in which I have indulged, as to the continuity, after having fully convinced myself of the chronological extravagancies, of the Páli genealogical annals anterior to the sixth century before the birth of CHRIST, have in no degree been produced by wilful misrepresentations on their part. It has been already noticed\* by me elsewhere, that the study of the Páli language is confined, among the natives of *Ceylon*, almost entirely to the most learned among the priesthood, and is prosecuted solely for the purpose of acquiring a higher order of qualification, for their sacerdotal functions, than those priests possess, who can consult only the vernacular versions of their

\* Introduction to the *Maháwanso*.

scriptures. Their attention, therefore, is principally devoted to the examination of the doctrinal and religious questions contained in their sacred books; and that study is moreover conducted in a spirit of implicit faith and religious reverence, which effectually excludes searching scrutiny, and is almost equally unfavorable to impartial criticism. The tone of confidence with which my native coadjutors sought in the *Piṭakattayan* for the several 'resolves' or 'predictions' of BUDDHO which are alluded to in a former paper\*, and the frankness of the surprise they evinced, when they found that none of those 'resolves' were contained in the *Piṭakattayan*, and only some of them in the *Aṭṭhakathá*, preclude the possibility of my entertaining any suspicion of wilful deception being practised. Confiding in their account of the historical merits of BUDDHAGHOSO's commentaries, which appeared to me to be corroborated by the frequency of the reference made in the *Tiká* of the *Maháwanso* to those *Aṭṭhakathá*, for details not afforded in the *Tiká*, I had impressed myself with the persuasion, that the *Aṭṭhakathá* thus referred to were BUDDHAGHÓS's Páli commentaries. Great, as may be readily imagined, was our mutual disappointment, when after a diligent search, persevered in by the priests, with a zeal proportioned to the interest they took in the inquiry, we were compelled to admit the conviction that BUDDHAGHÓS in translating the Sihala (Singhalese) *Aṭṭhakathá* into Páli, did not preserve the Indian genealogies in a connected and continuous form. He is found to have extracted only such detached parts of them, as were useful for the illustration of those passages of the *Piṭakattayan*, on which, in the course of his compilation, he might be commenting. He himself says in his *Aṭṭhakathá* on the *Dighanikáyo*†, "for the purpose of illustrating this commentary, availing myself of the *Aṭṭhakathá*, which was in the first instance authenticated by the five hundred *Arahantá* at the FIRST CONVOCATION, as well as subsequently at the succeeding CONVOCATIONS, and which were thereafter brought (from *Mágodha*) to *Sihala* by the sanctified MAHINDO, and for the benefit of the inhabitants of *Sihala* were transposed into the *Sihala* language, from thence I translated the *Sihala* version into the delightful (classical) language, according to the rules of that (the Páli) language, which is free from all imperfections; omitting only the frequent repetition of the same explanations, but at the same time, WITHOUT REJECTING THE TENETS OF THE THEROS RESIDENT AT THE MAHÁWIHÁRO (at *Anuradhapura*), who were like unto luminaries to the generation of

\* Journal for September, 1837.

† Vide Journal of July, 1837.



*theros* and the most accomplished discriminators (of the true doctrines)." All, therefore, of these genealogies, excluded from his *Atthakathá*, which are now found only in the *Tika* of the *Maháwanso*, or in the *Dipawanso*, as well as much more perhaps, illustrative of the ancient history of India, which the compilers of these two Ceylonese historical works did not consider worth preserving, BUDDHAGHÓSO must have rejected from his commentaries, to which he gave almost exclusively the character of a religious work.

My Buddhist coadjutors are consequently now reluctantly brought to admit, that the *Maháwanso*, with its *Tika*, and *Dipawanso* are the only Páli records extant in *Ceylon*, which profess to contain the Indian genealogies from the creation to the advent of SÁKYA; and that even those records do not furnish the genealogies in a continuous form. And, now that my mind is divested of the bias which had been created by their previous representations, and which led me to attach great importance to the historical portions of BUDDHAGHÓSO's *Atthakathá* I cannot but take blame to myself for having even for a time allowed that impression to be made on me. The author of the *Maháwanso*\*, in his *Tika*, declares more than once that he compiles his work from the *Sihala Maháwanso* and *Atthakathá* of the *Maháwiháro*, and from the *Sihala Atthakathá* of the *Uttarawiháro* fraternities, as well as from the *Maháwanso* of the *Uttarawiháro* priests. The last mentioned of these works alone, as far as I am able to form an opinion at present, was composed in the Páli language, at the time MAHÁNÁMO compiled his *Maháwanso*. I am induced to entertain this opinion from the circumstance, that MAHÁNÁMO's quotations from that work alone are in the metrical form, whereas all the translated quotations made by Páli authors from *Sihala* authorities are invariably, as might have been expected, rendered in prose. One of these quotations consists of the identical two verses with which the *Dipawanso* opens, and at the close of the *Tika* a reference is made to the *Dipawanso* for explanation of the violation of the *Maháwiháro* consecration, in the reign of MAHASENO. For these reasons, and as that work bears also the title of the "*Maháwanso*" or "the great genealogy," my Buddhist coadjutors concur with me in thinking, that the *Dipawanso* now extant is the Páli *Maháwanso* of the *Uttarawiháro* fraternity. In fact the titles of *Dipa* and *Mahá*, are indiscriminately given to both these histories. To prevent, however, their being confounded with each other, I shall continue to reserve the title of *Mahá* for MAHÁNÁMO's work, and that

\* Pages xxxi. xxxii. xlii. xliii. of the Introduction to the *Maháwanso*.

of *Dīpa* for the prior compilation, the author of which has not yet been ascertained.

It has been shown in the introduction to the *Mahāwanso*, that its author MAHĀNĀMO compiled his history in the reign of his nephew DHĀTASĪNO the monarch of Ceylon who reigned between A. D. 459 and 477, from the materials above described, a part of which was the version of the *Aṭṭhakathā* brought by MAHINDO from India in 307 before Christ, and translated by him into the *Sihala* language. This fact, coupled with many other circumstances inadvertently disclosed in the histories of the CONVOCATIONS, go far to prove that the *Piṭakatayan* and *Aṭṭhakathā* were actually reduced to writing from the commencement of the Buddhistical era, and that the concealment of their record till the reign of the Ceylonese ruler WATTAGAMINI, between B. C. 104 and 76, was a part of the *esoteric* scheme of that creed, had recourse to in order to keep up the imposture as to the priesthood being endowed with the gift of inspiration. The cessation of the concealment of these scriptures at that particular period, though attributed to the subsidence of the spirit of inspiration, in all probability, proceeded from the public disorders\* consequent upon the Chólián invasion, which led to the expulsion of that king and the priesthood from *Anurádhapura* by a foreign enemy, and to their fugitive existence in the wilderness of the island during a period of nearly 15 years.

The *Dīpawanso* from its being quoted by the author of the *Mahāwanso*, is unquestionably a prior work ; but as its narrative extends to the reign of MAHÁSENO in A. D. 302, its priority cannot exceed 150 years. In the Journal of December last, I have mentioned the circumstances under which I obtained possession of a Páli copy of the *Dīpawanso*, in a very imperfect state, written in the Burmese character. As this work and the *Mahāwanso*, with its *Tiká*, are the best Páli records I possess of the Indian genealogies, I shall proceed to make extracts from such parts of the *Dīpawanso* as may throw light on this subject ; adding a note in those cases, in which the *Tiká* is either fuller than, or at variance from, the *Dīpawanso*. I shall not attempt to tabularize these dynasties, as the lists of kings is avowedly and manifestly incomplete, and as no continuous chronological results could be safely deduced from any table formed from such mystified data. It will be observed that the names of even the three rājas, during whose reigns the three Buddhá who preceded GO'TAMO were manifested in this *kappo*, are omitted in these lists. And yet there are detached notices of those kings, as well as of other Indian rājas, both in the text and commentaries of the Buddhistical scriptures, which are in themselves well

\* Vide *Mahāwanso*, Chap. 33.

worthy of consideration, and to which I shall advert in future contributions.

The author of the *Dīpawanso* has certainly spared no pains in his endeavours to make the links of the *Thérāparamparā* chain complete, and consistent with chronology. He, however, only gives the succession of preceptors, who were the guardians of the *Winéyo* section of the *Piṭakattayan*, commencing with UPÁLI, whose death is placed in the sixth year of the reign of UDAYO; while the incongruities I have dwelt upon in the paper No. 2, have reference to SABHAKÁMI, who though a cotemporary disciple of BUDDHO, has been represented to have presided at the SECOND CONVOCATION, a century after SÁKYA's death; when he must, from the date of his *upasampadá* ordination, have been at least 140 years old. But even this succession of the *Winéyan* line of preceptors, the chronological particulars of which are pretended to be given with so much precision in the following extracts, will not stand the test of scrutiny by a person conversant with the rules that govern the Buddhistical church. It is an inviolable law of that code, established by BUDDHO himself at an early period of his mission, and adhered to to this day—to which rule there are only two well known exceptions—that no person, whether a novice priest called *Sámanéro*, or an ascetic layman, however learned or pious he may be, can be ordained an *upasampadá* before he has completed his twentieth year. The two exceptions alluded to are the instances of SUMANO and SOPÁKO who were ordained *upasampadá* at seven years of age.

It will be seen that this line of preceptors, extending from the date of BUDDHO's death to the THIRD CONVOCATION, a term of 236 years, is made to consist of five successions. UPÁLI the cotemporary of BUDDHO, is stated to have been 60 years old in the eighth year of the reign of AJÁTASATTU, which is the 16th year A. B. He is represented to have survived BUDDHO thirty years, and to have died in the 6th of UDAYO's reign in A. B. 30. It is not however, mentioned how many years he had been an *upasampadá*, and all these dates work out therefore without disclosing any discrepancy.

DÁSAKO is represented to be his pupil and immediate successor, and he is stated to be 45 years old in the 10th of NAGASOKO's reign, which falls to A. B. 58. He was born, therefore, A. B. 13, and his preceptor UPÁLI died A. B. 30. Supposing his ordination had been put off to the last year of UPÁLI's life, he could not have been more than 17, when made an *upasampadá*. So far from being qualified to be the *custos* of the *Winéyo*, he wanted three years of the age to make him admissable for ordination. But we are further told, that

he died at the age of 64 in the eighth of SUSUNÁGO's reign, which falls to A. B. 80: having then been an *upasampadā* 50 years, he must necessarily have been ordained at 14 years of age. But there is manifestly some trifling error somewhere; for, by the latter dates he must have been born not A. B. 13, but A. B. 16.

So'NAKO was DÁSAKO's successor: he was 40 in the 10th year of KÁLÁSOKO's reign, which was A. B. 100; he was born therefore in 60, and he is stated to have died at the age of 66 in the sixth of the reign of the NANDOS, which falls to A. B. 124. He was therefore only 20 years old when his preceptor died: but it is specifically stated that he had been a learned *upasampadā* 44 years when he died; and consequently So'NAKO also could only have been 16 years when ordained.

SIGGAWO and CHANDAWO or CHANDAWAJJI were the co-disciples and successors of So'NAKO. SIGGAWO was 64 years old in the second of CHANDAGUTTO's\* reign A. B. 164, and he died aged 76 in the 14th of that reign A. B. 176. He was born therefore A. B. 100, and yet we are told, that it was in this very year, the 10th of the reign of KÁLÁSOKO, they were ordained *upasampadā*, by So'NAKO. There is a manifest error, therefore, in the term of five years assigned for SIGGAWO's *upasampadā*ship. As his ordaining preceptor So'NAKO died A. B. 124, he must have been at that time only 24 years old, and at his own death an *upasampadā* of 76 years' standing,—a term co-equal with his natural life. In various parts of the *Atthakāṭha*, and in the fifth chapter of the *Mahāwanso* likewise it is stated that they were "adult priests" at the time the SECOND CONVOCATION was held; and indeed it is specifically stated in page 30, that SIGGAWO was 18 years old when he was first presented to So'NAKO. The pretended prophecy, delivered to him and CHANDAWAJJI at the close of that CONVOCATION, would consequently be nullified at once, if their birth be not dated anterior to A. B. 100: manifestly, therefore, these dates also are an imposition.

Lastly, MOGGALIPUTTATISso was their disciple; he was ordained in the second of CHANDAGUTTO A. B. 164, and he was 66 in the sixth of DHAMMÁSOKO A. B. 220; he was born, therefore, in A. B. 154, and could only have been 14 years old at the death of SIGGAWO, when he became the chief of the *Winéyo* preceptors. He is stated to have died in the 26th of DHAMMÁSOKO, A. B. 240, aged 80. This gives A. B. 160 instead of A. B. 154 for his birth, being a discrepancy of six years.

\* I assign in these remarks 24 years to the reign of CHANDAGUTTO, which will bring ASOKO's accession to A. B. 214, and his inauguration, four years afterwards, to A. B. 218.



On pointing out to my pandits, that, even in this elaborate adjustment of the succession of preceptors, the number of lives given is found to be insufficient to fill up a term of 236 years, without bringing the several preceptors into office before they had attained the prescribed age, they at once decided, that the author of the *Dīpawanso* has put forth an erroneous statement, and that the whole ought to be rejected as unfounded. How the discrepancies are to be rectified they do not suggest, beyond hazarding a conjecture, that each preceptor, like SABHAKÁMI, must have lived to a more advanced age; and that each succeeding preceptor consequently had attained a maturer standing at the period of his succession.

It is time, however, that I should proceed to extracts from the *Dīpawanso*.

*The Third Bhānawāro of the Dīpawanso.*

"Omitting the rājas who existed in former *kappā*, I will in the fullest manner narrate (the history of) the rājas of the present creation. I shall perspicuously set forth the regions in which they existed, their name and lineage, the term of their existence, and the manner in which they governed: whatever that narrative may be, attend ye thereto.

"The first individual who was inaugurated a rāja, the protector of the land, was named MAHA'SAMMATO; he was superlatively endowed with personal beauty; that *Khattiyo* exercised the functions of sovereignty.

"RO'JO was his son, WARARO'JO, the monarch KALYA'NO; WARAKALYA'NO, UPO'SATHO, MANDA'TO\* the seventh in succession, a supreme ruler of the four *dīpāt*, endowed with great wealth; CHARO, the rāja UPACHARO, and CHE'TIYO abounding in riches; MUCHALO; MAHA'MUCHALO, MUCHALINDO, SA'GARO; SA'GARADE'WO, BHA'RATO, BHA'GI'RATHO the *Khattiyo*; RUCHI', MAHA'RUCHI, PATA'PO, MAHA'PATA'PO, PANADO, MAHA'PANA'DO, the *Khattiyo* SUDASSANO, MAHA'SUDASSANO, and in like manner two of the name of NE'RU; and ACHCHIMA†, (were successively the sons of each preceding ruler.) The term of existence of these twenty-eight rājas was an *Asankhēyyān*; and the capitals in which these monarchs, whose existence extended to an *Asankhēyyān*, reigned, were Kusāwāṭṭī, Rājagahan and Methilā."

(Here follows the rule by which an *Asankhēyyān* is to be computed.)

"The descendants of ACHCHIMA' were one hundred; and they ruled supreme in their capital called Sakulāṣṭhī. The last of these was the *Khattiyo* ARINDAMO;

\* In the *Mahāwanso*, I have been misled by the plural *Mandātā*, and reckoned two kings of that name. I see by the *Tikā* the name should be in the singular *Mandāto*. The twenty-eight rājas who lived for an *Asankhēyyān* include therefore MAHA'SAMMATO.

† Jambudīpo, Uitarukuru, Aparagoyānan and Pubbawidēho.

‡ This name also has been erroneously omitted by me in the *Mahāwanso*. *Achchima* was there read *Pachchima*. The *Tikā*, however, shows that the *Dīpawanso* is correct.

§ In the *Tikā*, it is further stated: "The eldest son of ACHCHIMA' was the monarch WATTAPA'RA'SA'NI, though his name be not preserved, quitting *Mithelā* in the same manner that the *Okkāka* family quitting *Bārānasi* founded *Kapilawathu* in a

his descendants, fifty-six monarchs in number, reigned supreme in their capital *Ayujjhapurā*.

"The last of these was DUPPASAHO, a wealthy monarch : his descendants were sixty rulers, who reigned supreme in their capital *Barānasi*.

"The last of these was AJITAJANO ; his descendants eighty-four thousand in number ruled supreme in their capital *Kapilanagaran*.

"The last of these was BRAHMADATTO, greatly endowed with riches ; his descendants were thirty-six rājas in number, who reigned supreme in their capital *Hatthipura*.

"The last of these was the rāja KAMBALAWASABHO ; his descendants were thirty-two monarchs, who reigned supreme in their capital *Ekachakkhu*.

"The last of these was the illustrious PURINDA'WO ; his descendants were twenty-eight monarchs, who reigned supreme in their capital *Wajirāpura*.

"The last of these was the rāja SŌDHANO ; his descendants were twenty monarchs and they reigned supreme in their capital *Madhurā*.

"The last of these was the rāja DHAMMAGUTTO, powerful in his armies ; his descendants were eighteen monarchs, who reigned supreme in their capital *Aritthapura*.

"The last of these was the rāja NARINDASITTHI\*<sup>1</sup> ; his descendants were seventeen kings, who reigned supreme in their capital *Indupattapura*.

"The last of these was BRAHMEDE'WO<sup>2</sup> rāja ; his descendants were sixteen monarchs, who reigned in their capital *Ekachakkhu*.

"The last of these was the monarch BALADATTO<sup>3</sup> ; his descendants were fourteen rulers, who reigned supreme in their capital *Kōsambinagaran*.

"The last of these was celebrated under the title of BHADDADE'WO<sup>4</sup> ; his descendants were nine kings, who reigned in their capital *Kannakochchhanagaran*.

"The last of these was the celebrated NARADEWO ; his descendants were seven monarchs, who reigned supreme in their capital *Rājānanagaran*.

"The last of these was the rāja MAHINDO ; his descendants were twelve kings, who reigned supreme in their capital *Champākanagaran*.

"The last of these was the monarch NA'GADE'WO ; his descendants were twenty-five rulers, who reigned supreme in their celebrated capital *Mithilā*.

"The last of these was BUDDHADATTO<sup>5</sup>, a rāja powerful by his armies, his descendants were twenty-five monarchs, who reigned supreme in their capital *Rājagahan*.

"The last of these was DIPANKARO ; his descendants were twelve rājas, who reigned supreme in their capital *Takkasilā*.

"The last of these was the rāja TALISAKARO, his descendants were twelve rulers, who reigned supreme in their capital *Kusināra*.

"The last of these was the rāja PURINDO ; his descendants were nine kings, who reigned supreme in *Tāmalīti*.

"The last of these was the worthy monarch SA'GARADE'WO, whose son MAKHA'DE'WO† was pre-eminent for his deeds of charity ; his descendants were eighty-four thousand monarchs, who reigned supreme at *Mithilā*.

subsequent age, established himself at *Kasāwati*, raised the *Chhata* there, and there his dynasty flourished. His lineal successors in that empire were in number ninety-nine, the last of whom was ARINDAM, and they all ruled there under the designation of the *Achchimā* dynasty." I should infer from this passage that the capital called *Sakula* in the *Dipawanso* should be *Kusāwati*.

\* In the *Tikā* there are the following variations of appellation from the *Dipawanso* : 1. *Brahmasīwo*. 2. *Brahmadatto*. 3. *Baladēwo*. 4. *Hatthidewo*. 5. *Samud-dhadatto*.

† The *Tikā* observes in reference to the *Mahāwanso*, that according to the

“ The last of these was NE'MI, a monarch who received offerings from the *Déwá* and was a *Chakkawatti* (powerful sovereign), whose dominions were bounded by the ocean : the son of NE'MI was KALA'KAJANAKO\* ; his son was SAMANKURO : and his son was Aso'ko ; and his descendants were eighty-four thousand rulers who reigned supreme in their capital *Bārānusi*.

“ The last of these was the rája WIJAYO, a wealthy monarch : his son was WIJITASENO who was endowed with great personal splendor. DHAMMASE'NO, NA'GAEE'NO, SAMATHO, DISAMPATI, RAINU, KUSO ; MAHA'KUSO, NAWARATHO, DASARATHO, RA'MO, BILA'RATHO, CHITTADASSI, ATTHADASSI, SUJA'TO, OKKA'KO†, OKKA'KAMUKHO', NIPURO, CHANDIMA', CHANDAMUKHO, SIRIRA JA, SANJAYO, the monarch WESSANTARO, JALO, SIHAWA'HANO and SIHASSARO. These were enterprising monarchs, who upheld the pre-eminence of their dynasty ; and his (SIHASSARO'S) descendants were eighty-two thousand, who (all) reigned supreme in their capital *Kapilawatthu*.

“ The last of these was JAYASE'NO ; his son was SE'HAHANU who was endowed with great personal splendor. Unto the said SE'HAHANU there were five sons. Those five brothers were SUDDHO'DANO, DH'OTO'DANO, SUKKO'DANO, GHATITODANO and AMITODANO. All these rájas were distinguished as ODANO‡. SIDDATTHO, the saviour of the world, was the son of SUDDHO'DANO ; and after the birth of his illustrious son RAHULO, finally relinquished (worldly grandeur) for the purpose of attaining Buddhohood.

“ The whole of these monarchs, who were of great wealth and power, were in number one lakh, four *nahutáni*§ and three hundred. Such is the number of monarchs of the dynasty from which the *Bóddhisatto* (Buddho elect) is sprung.

“ Perishable|| things are most assuredly transitory, it being their predestiny that after being produced they should perish ; they, accordingly, being produced, pass away. To arrest this (eternity of regeneration and destruction, by the attainment of *nibbānan*) is indeed to be blessed.”

*The conclusion of the Mahārājawanso.*

“ The rája SUDDHO'DANO, the son of SE'HAHANU was a monarch who reigned in the city called *Kapila* ; and the rája BHA'TIYO was then the monarch who reigned at *Rájagahán*, a city situated in the centre of five¶ mountains. These two rulers of men, SUDDHO'DANO and BHA'TIYO, the descendants (of royal dynasties) from the commencement of the *kappó*, were intimately attached to each other.

“ (By BIMBISA'RO the son of BHA'TIYO) these five wishes were conceived in the eighth year of his age. ‘ Should my royal parent invest me with sovereignty :

*Atthakathá* MAKHA'DEWO is reckoned among the eighty-five thousand successors of *Sagaradewo*, whereas that number should be exclusive of him.

\* Here also the *Tiká* notices in reference to the *Maháwanso* that the eighty-five thousand are to be reckoned exclusive of SAMANKURO and ASÓKO.

† Vide *Maháwanso* Introduction, p. xxxv. for the establishment of the *Sákyan* dynasty of *Okkákamukho*.

‡ This word literally signifies “ boiled rice :” no reason is assigned for adopting the designation.

§ In this sense a *nahutan* is 10,000, making therefore 140,300 monarchs. According to the *Tiká* there were 252,539 rájas from MAHA'SAMMATO to OKKAKO, the *Iksuaku* of the Hindus.

¶ This is a passage of the *Pitakattayán* as propounded by SA'KYA.

¶ The names of these mountains are *Isigili*, *Wibháro*, in which is situated the *Sattapanni* cave in which the first convocation was held ; *Wéputto* ; *Pandawo* and *Gejjhakato*, the mountain where BUDDHO dwelt last in the neighbourhood of *Rájagahán*.

should a supreme of men (Buddho) be born in my dominions : should a TATHA'GATO select me for the first person to whom he presented himself : should he administer to me the heavenly *dhhammo* ; and should I comprehend that supreme *dhhammo*—these will be blessings vouchsafed to me.' Such were the five wishes conceived by BIMBISA'RO.

"Accordingly, on the demise of his father, he was inaugurated in the fifteenth year of his age : within his dominions the supreme of the world was born : TATHA'GATO repaired to him as the first person to whom he presented himself : propounded the heavenly *dhhammo* : and the monarch comprehended it.

"MAHA'WE'RO was not less than thirty-five years old, and the monarch BIMBISA'RO, was in the thirtieth year of his age. GO'TAMO therefore was five years senior to BIMBISA'RO. That monarch reigned fifty-two years, thirty-seven of which he passed contemporaneously with Buddho.

"AJA'TASATTU (his son) reigned thirty-two years : in the eighth year of his inauguration, the supreme Buddho attained *nibbānan*. From the time that the omniscient Buddho, the most revered of the world and the supreme of men attained Buddhohood, this monarch reigned twenty-four years."

### *The conclusion of the third Bhānawāro.*

NOTE.—A *Bhānawāro* ought to contain 250 gāthā. This section is only equal to 87, and some of the verses are incomplete. I can however detect no want of continuity in the narrative.

The fourth *Bhānawāro* commences with an account of the first convocation, which is already described in No. 1, of this analysis. This chapter then proceeds with a chronological narrative of the history of India, specifying also the contemporaneous dates of the reigns of the monarchs of *Ceylon*, and of the death of those inspired *Thérá*, who are considered to have constituted the connecting links of the chain called the *Thérápavampará* or generation of preceptors.

The following are the most important passages of this section :

"The sixteenth year after the *nibbānan* of the saviour of the world was the twenty-fourth of AJA'TASATTU, and the sixteenth of WIJAYO (the rájá of *Lanká*). The learned UPA'LI was then sixty years old. DA'SAKO entered into the *upasampadā* order in the fraternity of UPA'LI. Whatever may be the extent of the doctrines of the most revered Buddho which had been promulgated by that vanquisher as the nine integral portions of his dispensation, the whole thereof UPA'LI taught. The said UPA'LI thus taught the same, having learnt, in the most perfect manner, the whole of the nine portions of his doctrine, which have been auricularly perpetuated, from BUDDHO himself. BUDDHO has declared of UPA'LI in the midst of the congregated priesthood, 'UPA'LI being the first in the knowledge of *vinéyo*, is the chief in my religion.' He who had thus been selected and approved in the midst of the assembled priesthood, and who had a numerous fraternity, taught the three *Pitako* to a fraternity of a thousand bikkhus, of whom DA'SAKO was the chief disciple : he taught them (especially) to DA'SAKO and to five hundred *Thérá*, who had overcome the dominion of sin, were of immaculate purity and morals, and versed in the *wāḍa* (history of the schisms). The *thero* UPA'LI who had a great fraternity continued to teach the *vinéyo* for full thirty years after the *nibbānan* of the supreme BUDDHO. The said UPA'LI taught the whole of the eighty-four thousand component parts of the doctrines of the divine teacher to the learned DA'SAKO.



"DA'SAKO having learned the whole of the *Pitako* in the fraternity of UPA'LI, and held the office of *Upajjhāyo* (conferer of the sacerdotal ordination of *upasampadā*) propounded the same. The chief of the great fraternity (UPA'LI) having deposited (*tapetwana*) the whole *wineyo* in the charge of the learned DA'SAKO, died. The monarch UDAYO reigned sixteen years. It was in the sixth year of his reign that the thero UPA'LI demised.

"A certain trader named SO'NAKO who had come from the *Kāsi* country, and was proud of his high descent, entered the sacerdotal order in the religion of the divine teacher (BUDDHO) at the *Wéluwano*\* *wiharo* in the mountain-girt city (*Rājagahan*). DA'SAKO, the chief of the confraternity, sojourned in the mountain-girt city, the capital of the *Magadha* nation, thirty-seven years, and initiated SÓNAKO into the sacerdotal order. The learned DA'SAKO was forty-five years old, in the tenth year of the reign of the *rāja* NA'GADA'SO, and twentieth of the reign of the *rāja* PANDU (of *Lanká*).

"The thero SO'NAKO became an *upasampadā* in the fraternity of the thero DA'SAKO and the thero DA'SAKO taught SO'NAKO the nine component parts of the faith; and having learned the same from the preceptor who ordained him, he also taught the same. The thero DA'SAKO having invested SÓNAKO thero, who was the senior pupil in his fraternity, with the office of chief over the *wineyo*, died in the sixty-fourth year of his age.

"At the expiration of ten years and half a month of the reign of the *rāja* KA'LA'SOKO, the thero named SÓNAKO was forty years old, and he had then been a thero learned in the doctrines for fourteen years; and at the period of the expiration of ten years and six months, the thero SÓNAKO, who was the chief of a great fraternity, conferred the *upasampadā* ordination on SIGGAWO and CHANDAWO.

"At that period a century had expired from the time that BHAGAWA' had attained *nibbanān*, and certain (*bikkhus*) of *Wesāli* native of *Wajji* set forth these ten (new) tenets of discipline."

Here follows an account of the schism, and of the SECOND CONVOCATION held in consequence, in the tenth year of the reign of KÁLÁSOKO, with which the fourth *Bhānawāro* concludes, the particulars of which are given in the paper, No. 2, and in the *Mahāwanso*. The fifth commences with recapitulating the principal particulars of the FIRST and SECOND CONVOCATIONS and the schisms, and then proceeds:

"In the second year of the reign of CHUNDAGUTTO, when SIGGAWO was sixty-four years old, which was the fifty-eighth year of the reign of PANDUKA'BHAYO, the *rāja* (of *Lanká*) MOGGALIPUTTO was ordained an *upasampadā* in the fraternity of SIGGAWO; and the said MOGGALIPUTTATISSO, having acquired the knowledge of the *wineyo* in the fraternity of CHANDAWAJJI, was released from the sins inseparable from liability to future regeneration. Both SIGGAWO and CHANDAWAJJI taught the whole of the *Pitako*, which embraces both (the *wineyo*, discipline, and *dhammo*, doctrine), to the pre-eminently endowed MOGGALIPUTTO. SIGGAWO of profound wisdom died at the age of seventy-six, having constituted the pre-eminently endowed MOGGALIPUTTO the chief of the *wineyo*. CHANDAGUTTO reigned twenty-four years. In the fourteenth year of his reign SIGGAWO died.

"In the sixth year of the reign of DHAMMA'SOKO, MOGGALIPUTTO was sixty-six years old. MAHINDO was then ordained an *upasampadā* in his fraternity, and acquired a knowledge of the *Pitako*.

"UPA'LI attained his seventy-fourth, DA'SAKO his sixty-fourth, the thero SO'NAKO

\* This word signifies the bamboo grove.

his sixty-sixth, SIGGAWO his seventy-sixth, and MOGGALIPUTTO his eightieth year. The following are the periods that all of these theros were *upasampaddā*, of whom at all times the learned UPALI was recognized as the first chief, viz. ; DA'SAKO was an *upasampaddā* fifty, SÓNAKO, forty-four, SIGGAWO five\*, and MOGGALIPUTTO, sixty-eight years.

"UDAYO reigned sixteen years, and in the sixth year of UDAYO's reign, UPALI died.

"SUSANA'GO, the opulent monarch, reigned ten years, in the eighth year of SUSANA'GO's reign, DA'SAKO died.

"At the demise of SUSANA'GO he had ten brothers, who collectively reigned twenty-two years, in great celebrity. In the sixth year of their reign SÓNAKO died.

"CHANDAGUTTO reigned twenty-four years, and in the fourteenth year of his reign SIGGAWO died.

"The celebrated DHAMMA'SÓKO the son of BINDASA'RO reigned thirty-seven years. In the twenty-sixth year of his reign, MOGGALIPUTTO died, having caused religion to be glorified, and having completed the full measure of human existence.

"The learned UPALI, the chief of a great fraternity died at the age of seventy-four, having appointed his learned disciple DA'SAKO to the office of chief *wineyo*.

"DA'SAKO, died at the age of sixty-four, having appointed his senior learned disciple SO'NAKO to the office of chief of the *wineyo*.

"SO'NAKO, who was endowed with the six *abinná*, died at the age of sixty-six, having appointed his *arahat* son (disciple) SIGGAWO to the office of chief of *wineyo*.

"SIGGAWO who was endowed with the six *abinná*, died at the age of seventy-six, having appointed his son (disciple) MOGGALIPUTTO to the office of chief of *wineyo*.

"MOGGALIPUTTASSO died at the age of eighty, having appointed his disciple MAHINDO to the office of chief of *wineyo*.

*The conclusion of the fifth Bhānawāro.*

"PIYADASSANO† was inaugurated in the two hundred and eighteenth year after the death of the supreme BUDDHO. At the installation of PIYADASSANO preternatural manifestations took place."

(For these manifestations I must refer to the *Mahāwanso*.)

"That royal youth, who was the grandson of CHANDAGUTTO and the son of BINDUSA'RO was at that time the (*karamolino*) ruler of Ujjeni.

"In the course of an official circuit he visited *Wessanagarān*; where lived a damsel, the daughter of a *Sitthi*, who became celebrated under the name of DEWI. By his connection with her, an illustrious son was born. (The said son) MAHINDO and (his daughter) SANGAMITTA' formed the resolution to enter the order of priesthood. Both these individuals having been thus ordained, overcame subjection to regeneration. ASÓKO was then reigning in the illustrious *Pataliputto*. In the third year of his inauguration he became a convert to the religion of the supreme BUDDHO. (If it be asked) what the duration of the term is, from the date of the *parinibbānan* of the supreme BUDDHO to the date of the birth of MAHINDO, who was descended from the *Moriyan* dynasty, (the answer is) two hundred and five years. In that year MAHINDO the son of ASÓKO was born. In MAHINDO's tenth year, his father put his own brothers to death; and he past four years in reducing *Jambudīpa* to order. Having put to death his hundred brothers, and reduced the dynasty to one

\* This is evidently a mistake.

† The reign of KA'LA'SOKO is omitted, who was the father of the *Nandos* who are here designated the brothers of SUSANA'GO.

‡ Having erroneously written this name "PIYADASINO" in a former paper, Vol. VI. p. 1056, you have been led to suppose it was the genitive case of *Piyadāsi*.

(family), they (the people) inaugurated him in the fourteenth year of MAHINDO's age. ASÓKO, who was endowed with great personal superiority and good fortune, and was destined to rule the world, was inaugurated under miraculous manifestations. They installed PİYADASSANO on his completing his twentieth year\*."

The account of the interview with *Nigrodho*, the expulsion of the brahman sects, and the construction of the wiháros is then given, to the close of the sixth *Bhánawáro*.

The seventh *Bhánawáro* begins with the account of MAHINDO and SANGAMITTÁ being admitted into the order of the priesthood, (the former was at once ordained *upasampadá*, being of the age of twenty; but the latter remained a *samanéri* for two years, being only eighteen,) in the sixth year of ASÓKO's inauguration. These particulars will be found in the *Maháwanso*.

"ASÓKADHAMMO was fifty-four years old at the time of his inauguration, and at the time of ASÓKADHAMMO being inaugurated, MOGGALIPUTTATISSO was sixty-six. MAHINDO entered into the order of priesthood in the fraternity of MOGGALIPUTTATISSO. MAHA'DE'WO performed the ceremony of admission, and MOJJHANTO, the ceremony of the *upasampadá* ordination. These were the three preceptors who qualified MAHINDO for the priesthood. The said preceptor MOGGALIPUTTATISSO taught MAHINDO, who illuminated (*Lanká*) *dīpo*, the whole of the *Pitako*, both as regards its import and its doctrine. In the tenth year of MAHINDO's (ordination) having acquired a perfect knowledge of the whole creed, he became the head of a fraternity, and (*pachariyo*) a subpreceptor (under MOGGALI). The said MAHINDO, having thus acquired a knowledge of the perfectly profound and well arranged (*Piṭakattayán*), containing the two doctrinal portions (the *winayo* and the *abhidhammo*) and the *suttako* (the parables) as well as the history of the schisms of the preceptors, became a perpetuator of the same. MOGGALIPUTTATISSO thus perfected MAHINDO the son of ASÓKO, in the knowledge of the three *wejja* and the four *patisambhidá*, and (thereby) MOGGALIPUTTATISSO permanently established in his disciple MAHINDO, the whole of the *Piṭakattayán* which had been thus handed down to him.

"NIGRÓDHO was admitted into the priesthood in the third year of ASÓKO's reign, his brother (Tisso) in the fourth, and in the sixth his son MAHINDO. Tisso and SUMMITAKO, the two theros who were descended from the *Kunti*, and were endowed with supernatural powers, died in the eighth year of the reign of ASÓKO. From these two princes having entered the order of priesthood, and from (the manner in which) these two theros died, multitudes of the *khattiya* and *brahman* castes proclaimed themselves to be devotees in this creed, and great benefits and honors resulted to the religion of the vanquisher; and the heretics, who had been influential schismatics, lost all their ascendancy. The *pándarangá*, the *jaṭṭhā*, *niganthá*, *chétaká* and other sects for seven years continued, however, to perform the *upósatha* in separate fraternities. The sanctified, pious, and virtuous ministers (of BUDDHO) would not attend those *upósatha* meetings. At this conjuncture, it was the two hundred and thirty-sixth year (of the Buddhistical era)."

The *Dipawanso* then gives the account of the THIRD CONVOCATION and of the dispersion of the missionaries for the promulgation of Bud-

\* This is evidently a clerical error, his son MAHINDO being then fourteen years old. It was subsequently mentioned that *Asókodhammo* was forty-five years old at his inauguration.



dhism through the adjacent kingdoms of Asia, viz. *Gandhāro*, *Mahiso*, *Aparantako*, *Maharāthhān*, *Yōnó*, *Hiwawanto*, *Suwannabhūmi* and *Lankādīpo*.

The ninth *Bhānawāro* commences with the history of *Ceylon*, and it is singular that the origin of the *Sihāla* race is here divested of the fabulous character given to it in the *Mahāwanso* to the extent formerly suggested by me. If the popular legend of the lion (*siho*) had not been previously known, the account in the *Dīpawanso* would have been rendered, by any unprejudiced translator, into English without naming the fabulous monster, literally thus :

" This island *Lanka* acquired the name of *Sihala* from *Siho*\*. Listen to this narrative of mine, being the account of the origin of this island and this dynasty. The daughter of a king of *Wango*, having formed a connection with a certain *Siho*, who found his livelihood in a wilderness, gave birth to two children. These two children named *SI'HABA'HU* and *SE'WALI* were of prepossessing appearance. The mother was named *SUSIMA'*, and the father was called *SIHO*, and at the termination of sixteen years, secretly quitting that wilderness, he (*SI'HABA'HU*) founded a city, to which capital he gave the name of *Sihapura*. In that *Lāla* kingdom, the son of *SI'HO* becoming a powerful monarch, reigned supreme in his capital *Sihapura*."

This *Bhānawāro* proceeds with the account of *WIJAYO* landing in *Ceylon*, and the establishment of his dynasty, omitting however, entirely, *WIJAYO*'s marriage with *KUWE'NI*, and narrates the reigns of the ensuing kings to *DE'WĀNANPIYATISSO*, assigning to them reigns of the same duration, as that given to them in the *Mahāwanso*. We then find the synchronisms in the chronologies of India and *Ceylon*, which are quoted in the introduction to the *Mahāwanso* from the *Atthakathā* in the *Winéyo*.

I do not notice any matter in the *Dīpawanso*, not found in the *Mahāwanso*, till I come to the eighteenth *Bhānawāro*. The *thériparamparā*, or succession of preceptresses is there given, taken from the *Atthakathā* on the *Winéyo* in the following words :

" She who was renowned under the appellation of *Pajāpati*, and was of the *GOTAMO* family, endowed with six *abinnā* and with supernatural gifts, the younger sister, born of the same mother, of *MAHA'MA'YA'* (the mother of *BUDDHO*) : and who, with the same affection as *MA'YA* herself nourished *BHAGAWA'* at her breast, was established in the highest office (among priestesses).

\* "*Pachchantan*," I have translated, "foreign" in the *Mahāwanso*, as the word is compounded of "*pati*" and "*antan*." It would be better rendered as "situated on the confines."

*Wanawāsi* is here omitted, probably by an error of transcription.

This passage is important *Mātacha Susimānāma, pitācha Sihasawhayo*. If "*Siho*" was intended for a "lion," "*Sawchayo*" which signifies "named" or "called" would not be used.



"The following are the priestesses who (in succession) acquired a perfect knowledge of the *wineyo*, viz. : KHE'MA' UPPALAWANNA', two of each name, and PATA'-CHA'RI, DHAMMADINNA', SÓBHITA', ISIDA'SIKA', WISA'KHA', ASÓKA', SAPALA', SANGHADA'SI, gifted with wisdom, NANDA' and DHAMMAPA'LA', celebrated for her knowledge of *Winéyo*.

"The theri SANGHAMITTA', UTTARA', who was gifted with wisdom, HE'MAPA'SA, DASSALA', AGGAMITTA', DASIKA', PHEGGUPABBATA', MATTA', SALALA', DHAMMADA'SIYA—these juvenile priestesses came hither from *Jambudīpo*, and propounded the *Winayapīṭako* in the capital designated *Anurādhapura*—they propounded not only the five divisions of the *wineyo*, but also the seven *Pakaraṇāni*.

"The females who were ordained *upasampadā* by them in this island were SÓMA, devoted to *Dhammo*, GORIDI'PI', DHAMMADA'SIYI, DHAMMAPA'LA' versed in the *wineyo*, MAHILA conversant in the *dhutawādā*, SÓBHANA, DHAMMATA, PASSANAGAMISSA', also versed in the *wineyo*, and SA'TA KA'LI profound in the theri controversy, and UTTARA'.

"Under the instructions of A'BHAYO\* celebrated for his illustrious descent, the aforesaid priestesses as well as SUMANA† renowned for the doctrinal knowledge among her sisterhood, a maintainer of the *Dhūtāṅgā*, a vanquisher of the passions, of great purity of mind, devoted to *dhammo* and *wineyo*, and UTTARA' endowed with wisdom, together with their thirty thousand priestesses, were the first priestesses who propounded at *Anurādhapura*, the *wineyo*, the five *Nikāye* (of the *Suttapiṭako*) and the *Suttapakaraṇé* of the *Abhidhammo*.

"MAHA'LA equally illustrious for her knowledge of the *dhammo* and for her piety, was the daughter of the monarch KA'KAWANNO GIRIKA'LI, profoundly versed by rote, was the daughter of his *Pooróhito* (the almoner of KA'KAWANNO'); KA'LADA'SI and SABBAPA'PIKA' were the daughters of GUTTO. These priestesses, who always maintained the orthodox texts, and of perfect purity of mind, were versed in the *dhammo* and *wineyo*, and having returned from the *Róhana* division maintained by the illustrious ruler of men ABHAYO‡, propounded the *Winéyo*, at *Anurādhapura*."

The remainder of this passage is so confused as not to admit of a continuous translation.

In the twentieth *Bhānawāro* is specified the reducing the scriptures to record, in precisely the same two verses as in the *Mahāwanso*; and in the twenty-second it is mentioned that WASABHO the rāja of *Ceylon*, between A. D. 66 and 110, brought water into the town of *Anurādhapura* through a tunnel "*ummaggo*," and with this *Bhānawāro*, the *Dīpawanso* terminates at the close of the reign of MAHA'SE'NO.

\* ABHAYO, the brother of DE'WANANPIYATISSO.

† Vide Index of the *Mahāwanso* for this name.

‡ Vide Index for *Gāmini Abhayo*, the name of DUTTHAGA'MINI before he recovered the kingdom.

II.—*Report on the Copper mines of Kumaon. By Capt. H. DRUMMOND, 3rd, B. L. C.*

Many of our readers will be aware, that Capt. DRUMMOND of the 3rd Light Cavalry, brought with him to this country when he returned about two years ago from furlough, a practical miner from Cornwall, and that, upon his application, the sanction of Government was given to the employment of this person, under Capt. DRUMMOND's superintendence, in the examination of the capabilities of the mines of copper in *Kumaon*, with a view to the introduction eventually of a better method of working them. These mines were reported upon at length by Capt. HERBERT ten years ago, but as the observations of a practical workman upon their present condition, and upon the methods of extracting the ore which are in use, cannot be without interest, the Government has permitted the following report by Capt. DRUMMOND of his proceedings to be printed in these pages.

*Mines of copper in the eastern districts of Kumaon.*

Of the mines of copper situated in the eastern division of this province only two are now worked, one at *Rye* in the pergunnah of *Gungowly*, the other at *Sheera* in *Barrabeesy*, the rest, namely, *Belar*, *Shore*, *Goorung*, and *Chincacolee*, have all fallen in, and been abandoned, and are consequently inaccessible at the present moment.

The mines of *Rye* and of *Sheera* have been worked nearly to the extent available, that is to say, available so far as native mining (or rather burrowing) can accomplish; not that the resources of these mines are by any means exhausted, but only that part, which being near the surface, can be obtained without the aid of skill and capital.

From the length of time that these mines have been worked, the appearance of the ground about them could not be expected to be very different from the condition in which it was found, but their poor state at present is no argument, why they should not become very profitable when prosecuted to a greater depth.

In other countries it seldom happens, I believe, that mines of copper are found to be productive near the surface, and in Cornwall few of them ever yield a return till a considerable depth underneath is reached, as much as 30 or 40 fathoms. And the greater part of this distance consists generally of little else than the mere ferruginous substance, termed *gossan*, which covers the ore, whilst scarcely any of the latter can be discerned. By analogy therefore the same may be expected here, and this is so far confirmed by the native miners, as well as by the present and former lessees of the mines, who assert

that the quantity of ore increases considerably in the downward direction. In no instance have I yet learned of a mine having been given up on account of deficiency of copper ore: all concur in the belief that there is no want of ore, but a great want of the means for extracting it.

*Rye mine—Pergunah of Gungowlee.*

This mine is opened on the eastern side of a hill of moderate elevation. The rock formation is composed of dolomite and talc. The dolomite\* occurs compact, slaty and crystalline, and might frequently be mistaken for common primary limestone, but its feeble effervescence in acids readily distinguishes it as a magnesian carbonate of lime. The talc occurs in beds, both indurated and slaty (the soapy killas of Cornwall); and it is in these beds that the ores of copper are found in numerous strings, having every appearance of being leaders, as they are called, to solid ore, and maintaining a distinct course, which I shall accordingly denominate lode, agreeably to the term used in mining. The strike, or direction, of the strata, is nearly W. N. W. and E. S. E. dipping at an angle of about  $45^{\circ}$  to the N. N. E.

The present entrance is by an adit or passage, which serves as a drain. The adit is driven on the course of one of these lodes, which continues west about 10 fathoms, when it falls in with another lode, that alters its direction to  $15^{\circ}$ , and afterwards to  $30^{\circ}$  north, inclining nearly  $50^{\circ}$  to the east of north. At the time I penetrated to the working part of the mine, it was then about 58 fathoms from the entrance. The lode had been taken away from underneath, as deep as the miners could manage to excavate, and its place filled up with rubbish. Above also they had taken it away as high as it was found to be productive; and, when I saw them at work, they were then extending their operations in the same westerly direction, the lode being about two feet wide, and containing good yellow copper ore, but with a large proportion of its talcous matrix, 20 per cent. only being metalliferous.

The passage varies from two to four feet in height, and from two to two and a half in width; the superincumbent hard dolomitic rock not allowing the labourers to make it higher, without having recourse to blasting, with which they are totally unacquainted. A short distance above the entrance is an old adit, which has been carried on the course of the same lode, and is now kept open for the purpose of ventilation.

\* Dolomite is not a rock producing copper in England, but it is known in other countries to contain ores of this metal and of iron. The rich mines of Cuba are said to be in it.

The yellow sulphuret of copper, or copper pyrites, in its perfectly pure state yields about 30 per cent. of metallic copper ; and though not a rich ore, is the most important of any from its abundance, and from being generally more to be depended on for continuance than the richer varieties\*. In England, more copper is obtained from it than from all the other ores together ; and, should this mine be prosecuted to a greater depth, I have no doubt, that the strings of ore above mentioned, will be found to lead eventually to solid ore, when data as to the actual capabilities of the mine may with certainty be obtained.

In the event of an experimental mine being established here, a new adit, 80 fathoms in length, will require to be brought in lower down the hill, so as to reach the present mine 10 fathoms below the entrance, and drain the whole of it, along with a considerable quantity of new ground, which the natives report to be very rich, but say they cannot work it on account of the accumulation of water.

About a couple of hundred yards to the north, and in the same hill, is another deposit of copper. This is laid open to the surface during the rainy season, and allowed to fall together again, as soon as the water, employed by the natives to carry off the talcous mud from the ore, ceases to be plentiful. An awkward attempt had been made by the present *teekadar* (lessee of the mine), to mine this with timber, but without success ; and it was at the time I visited the spot abandoned, and the works lying full of water. To have an effective mine here, it will be necessary to sink a perpendicular shaft of 12 fathoms, and to bring in an adit about 50 fathoms in length, so as to come under the works above described about eight fathoms, and lay open a space of ground, also believed to contain a considerable quantity of ore.

*Sheera mine—Pergunah of Barrabeery.*

The mine of *Sheera* is situated on the northern side of a hill, somewhat higher than the one at *Rye*, and is entered by an adit, which is driven south in the course of an evidently non-metallic vein, (no traces of copper being found in it :) and this the natives must have made use of, to assist them in penetrating the dolomite rock, which, with beds of talc, constitutes here likewise the formation where in the ores of copper are discovered. Nearly 33 fathoms from the entrance, the adit strikes a copper lode, on which a level passage is driven, that continues westward, its course being about 10° south of west, and dip northerly from 45 to 50°. Scarcely any thing could be seen of this lode, which has been all taken away, and its place supplied with timber, until I arrived at the end of the level, (18 fathoms in length,) where it seems to inter-

\* Extensive beds of copper pyrites occur in the mining districts of Sweden.



sect another lode, running in a northwest and southeasterly direction, which is poor at this particular locality. The former lode resembles the ore at *Rye*, but the ore is harder and more contaminated with iron pyrites.

The adit is also continued south from the strike of this lode a few feet, when it enters a confused mass of timbering and stones, having the appearance as if ore had been excavated in every direction; it then runs  $15^{\circ}$  west of south, and is about 10 fathoms in length. At the end of this passage, a pit is sunk (said to be 35 feet deep) on a lode running  $5^{\circ}$  north of west. When I penetrated to the spot, it was half full of water, which six men were constantly employed in lifting up in small buckets, to prevent the flooding of the working part of the mine, with which there is a communication, as is evident from the currents of water and air that come from that quarter.

The *teekadar* reports the lode at the bottom of the pit to be very rich, but complains of deficiency of hands to work it. Should the passage of the mine be enlarged, men of a different caste from the miners might be employed to draw off the water, and the whole of the miners set to work at the ores. There is no want of ventilation, as the air is constantly circulating from the works to the pit, and from thence to the strike of the first lode, not far from which are two holes brought down from an old adit, formerly the drainage of the mine. The appearance of this mine warrants the repairing and enlarging of the adit, which is the first thing to be done: more satisfactory data will then be obtained as to the character and number of the lodes, than can be hoped for in its present wretched state: the bringing in of a new adit may then be taken into consideration.

I shall now offer a few practical observations by my mining assistant, contrasting the modes of working here with what he has been accustomed to witness in Cornwall.

1. "The mode of excavation.—This is performed with a very indifferent kind of pick-axe; the handle being made of a piece of wood with a knob at one end, into which a piece of hard iron is thrust and sharpened at the point. This, with a miserable iron hammer, wedge and crowbar, constitutes all the apparatus that the native miner has to depend upon. It is plain that with such tools no hard rocks can be penetrated, nor can the softer ones be worked with much facility; and to this fact may be attributed the universal smallness of the passages throughout the mines; as the native miner can have his passage no larger, than the rock which encloses the ore and its matrix will admit of.

"I would therefore suggest that proper pickaxes and steel gads

(wedges) be substituted instead of the inefficient tools in use, and when blasting may be required the necessary materials should be provided. On the other hand, where timber may be requisite, sawn wood should be used to render the passages permanent and secure, in place of the branches of trees now employed for that purpose; and I judge from experience, that a man accustomed to work under these improved circumstances will excavate and extend a large and commodious passage in a less time by one-third, than that occupied for the same distance in excavating the miserable holes under the native mode of working.

2. "The conveying the ores and refuse from the mine.—This is performed by boys, who pick up the stuff with their hands, and put it into skins, which they drag along the floor to the entrance of the mine. In place of this method, wheel-barrows and shovels should be used, when the passages are enlarged; and a boy might then easily discharge *four times* as much as he can at present.

3. "The pulverizing of the ores.—This is performed by women: a large hard stone being placed on the ground on which they lay the ores; they then either with a stone, or hammer, more frequently the former, proceed to pulverize them and to pick out the impurities: in this manner a woman may manage from one to two maunds per day, according to the hardness of the ores. In Cornwall, a woman will pulverize from 10 to 15 hundredweight per day, according, as in the former case, to the nature of the ores. The method in practice there is, first to dispense with the picking:—secondly, to have the ores elevated, so as to enable the individual to stand while working, and to have a plate of iron about a foot square and two inches thick on which the ores are broken with a broad flat hammer: the impurities are then finally separated by a peculiar mode of dressing the ores with a sieve, by which a boy gets through with from one and a half to two tons per day. The ores are conveyed to the women, and from them to the boys by a man who attends for that purpose.

4. "The washing and cleansing of the poorer ores from slime and other impurities.—This also is performed by women, who carry the stuff from the entrance of the mine to a stream in baskets, where they contrive, by dabbling with their hands, to wash off the mud and finer particles of earth. They then proceed to pick out all the pieces of ore they can get hold of; or in the case of what may be submitted to the water in a comminuted state, they work this against the stream, so as to gather it clean at the head of a small pit by handfulls; but, from the bad construction of the pits, it is with difficulty that this is performed. After picking up any larger pieces of ore, which may have gone back

with the stream, they scoop out the refuse with their hands, and then proceed with another charge. In Cornwall, one woman provided with a wheel-barrow and shovel for the conveying and washing of the ores, and a boy with a sieve for dressing them, as formerly mentioned, would accomplish an equal task to that of ten women on the system described.

5. "The drainage of the mine.—In the first place, this is managed in a proper manner by an adit. But whenever any attempt is made to go below it, as is the case in most, if not all the mines, the water is then raised in wooden buckets handed from one man to another, until they reach the adit into which they are emptied. In this manner six, ten or even more men may be employed, whilst only an inferior number can be spared for excavating the ores. At the *Sheera* mine, for instance, six men are constantly engaged in lifting up the water, and there are only two at the ores: the water raised by these six men, could be effected with a hand-pump by one man: but, in order to keep the pump constantly going, two men might be required, and the remaining four added to the number of those who are excavating.

Lastly.—"To obtain sawn wood for rendering the passages permanent and secure, the art of sawing, which is entirely unknown to the people here, ought to be introduced."—

The foregoing remarks having reference simply to the rude and inefficient mode of work now actually in practice in this province, the rectifying of them will form the first stage of improvement. No allusion has hitherto been made, to the vast results from machinery, which in England may be witnessed in almost every mine; nor have the important processes of reducing the ore to the metallic state, been yet adverted to, though these are on a parallel with what has been said on the subject of extraction\*. However, from the statements which have been made, it may be seen, that notwithstanding the mountaineer receives but a very slight remuneration for his labor, yet considering the extravagant manner in which that labor is expended, an exorbitant rate is paid for the really serviceable work performed. Thus it is not so much the grinding avarice of the *teekadar*, that oppresses the miner, as the system upon which he works, that cannot admit of his being much better paid. To relieve this class of people, therefore, and raise their condition, it is much to be desired, that a new management should be adopted; while, on the other hand, were the mines equal to the very best in Cornwall, no great profit could ever accrue from them, worked as they are at present.

\* The charcoal smelting furnaces of Sweden appear to me to be the best suited for these mountains.

The almost inaccessible state of these mines, and the great difficulty of making any observations at all in such places, as well as the interruption alluded to heretofore, namely, the illness of my assistant whom I was obliged to bring back to cantonments in a very precarious state of health, have prevented me from making this report so full as I should have wished. It appeared to me desirable to take, in the first instance, merely a rapid glance at the whole of the copper mines throughout the province, before the setting in of the rains, (when they become inaccessible,) with the view of determining the most eligible locality for bringing the question of their productiveness to the test of experiment. The mines of the western purgunahs, which, by all accounts, are the richest, I have not yet had an opportunity of examining; but though my plans have been frustrated in that respect, I can nevertheless recommend a trial of one of those I have already visited; to wit, the *Rye* mine. It is unfavorably situated for a new adit; but from the appearance of the ground, and the probability of cutting new lodes underneath by traverses from the one now worked, the superior quality of the ore, together with what information I have been able to gather from the natives, as to the character of the lode at a greater depth, I consider it in every way the best suited for an experiment, an estimate of the probable expense of which is herewith annexed\*. Should the government deem it expedient to authorize the work being commenced, my mining assistant, Mr. WILKIN, is fully competent to carry on the detail; and Lieut. GLASFORD, executive engineer of *Kumaon*, has offered his services to superintend, as far as his other duties in the province will permit, and to further the undertaking by every means in his power.

I shall now conclude with a summary of the different points of inquiry, upon which I should wish to ground my next report of the mines of copper in this province.

Some account of the rocks, considered in an economical point of view.

The ores seem to be of the usual varieties, and need merely to be specified. Assays from selected specimens hardly give a correct estimate of produce†.

The important thing to be noticed is, the quantity that may be obtained. This will depend principally on the width of the lodes, and

\* It is estimated by Capt. D., that the cost of the proposed new adit at Rye will be above 2400 rupees.

† The working ore I have hitherto seen has been copper pyrites, grey copper ore, and the green carbonate I have met with, but in too inconsiderable quantity to deserve notice.



how far that width is occupied by solid ore, or how much it is intermixed with spar, talc and other matters\*. Also, on the continuity of branches of ore to a reasonable extent, or, on the other hand, on their being short and occurring at considerable intervals.

Again, the character of the lodes will have to be described,—whether beds conforming with the stratification of the country, or veins traversing the same.—Whether numerous, parallel to each other, or crossing.—What their direction usually is by the compass.—Whether vertical, or at what angle they deviate from being vertical.—Whether they are rich at particular places, as where veins intersect each other.—What is the character of the mineral matter, filling the lode where ore is deficient.—Whether this character is different, when near the surface, or when observed at greater depths.—What proportion of the lode appears to be metalliferous, and what barren.

*Facilities for working.*

Many considerations come under this head—character and habits of the natives—rate of payment for labor—state of roads and means of transport—supply of timber and other articles required—means of drainage, such as levels for obtaining adits—falls of water for machinery—streams whether constant and sufficient. As no mining operations upon an extended scale can be carried on without a command of cheap and good iron, I shall next advert to the mines and manufacture of this metal, and point out the peculiar advantages possessed by these mountains, over other parts of India, for improvements in that valuable branch of the natural resources of the country.

*September, 1838.*

III.—*Observations on six new species of Cyprinidæ, with an outline of a new classification of the family. By J. McCLELLAND, Esq., Bengal Medical Establishment.*

It is almost unnecessary to refer to the following passage which is inserted under the head of European correspondence, page 110, volume I. of this Journal, but it is so apposite to my subject that I must be excused for quoting it as it stands. “I spent some time in *Paris* this summer and saw a good deal of M. CUVIER. I used the freedom of mentioning your name to him and your desire of taking

\* In the western pergunahs, Captain HERBERT, in his geological report particularises grey, purple, and vitrious copper ore.

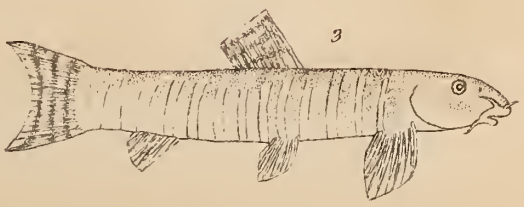
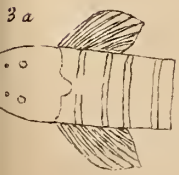
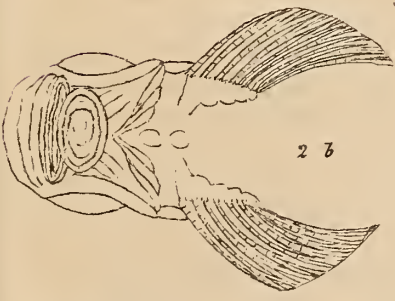
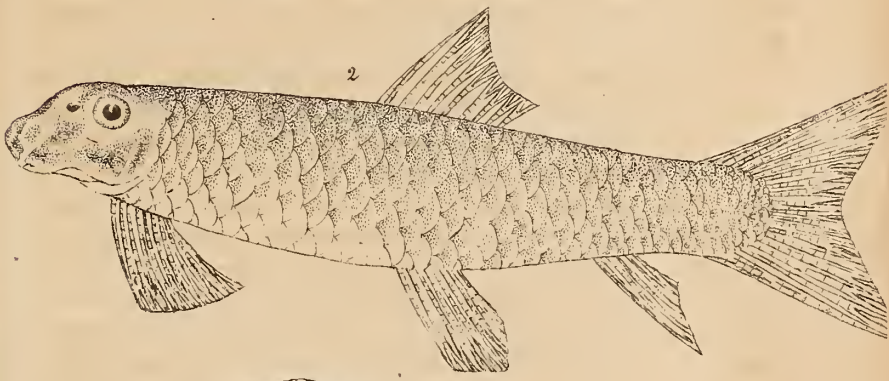
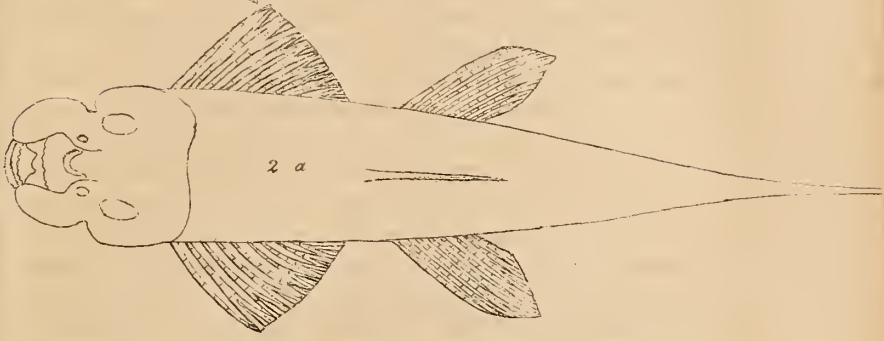
advantage of your position to forward the interests of science. I asked him if there was any particular object in natural history which I might suggest to you as a desideratum which could be supplied from India. He immediately replied emphatically 'ah certainement, les poissons d'eau douce;' he added that some gentleman in Calcutta had already sent him a good many of those of the lower rivers and parts of the country, but that they had no account of those of the higher parts."

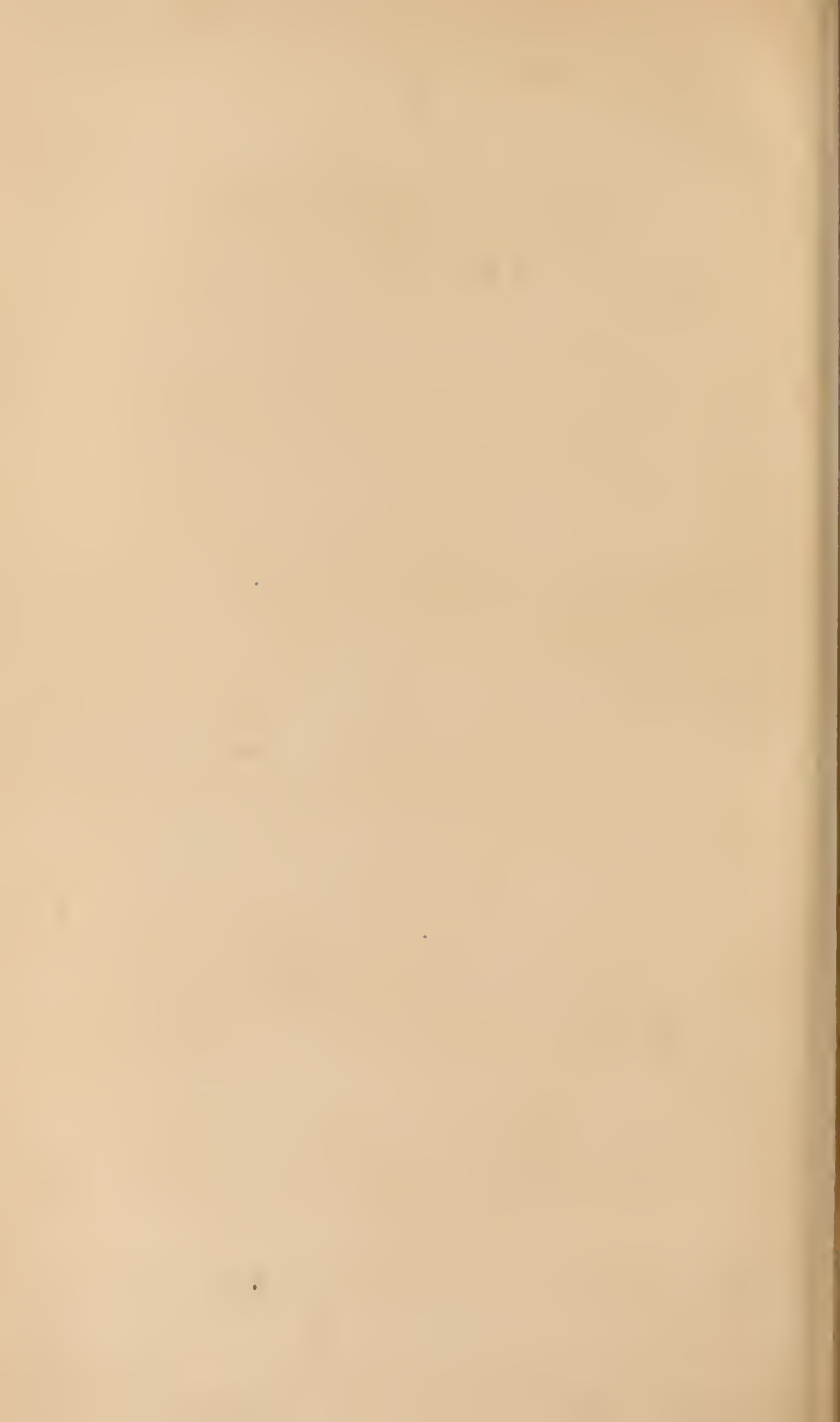
BUCHANAN states, that while engaged in the provinces remote from the sea he met with few species he had not before seen, but previous to his departure for Europe, on returning to the vicinity of the large estuaries he daily met with unknown species. In the large rivers above the influence of the tides he therefore supposed that not more than one species in five escaped his attention, while of those of the estuaries he had not described above one half. These last have recently engaged the attention of Dr. CANTOR, who during the season of 1836-7 accompanied the surveying expedition under Capt. LLOYD as medical officer, while I have been engaged in the former since my journey to *Assam* in 1835.

The results prove the accuracy of BUCHANAN's remarks, for while most of those obtained by Dr. CANTOR in the *Sunderbuns* have proved to be new, not more than one in five of the fresh water species inhabiting the large rivers in the interior, escaped the observation of BUCHANAN; but when we trace those rivers upwards from the commencement of the rapids into the mountains, the number of unknown forms augments in proportion to those that have been described, so that we may reverse the ratio given by BUCHANAN, and consider not more than one in five as having hitherto been made known, thus corresponding with CUVIER's notion 'that we have no accounts of those of higher parts.' Still, if CUVIER had been acquainted with the extent of BUCHANAN's labours on the subject, he would have seen that the whole of that author's *Garra* are Alpine forms. This peculiar group which I have incorporated with the genus *Gonorrhynchus* is fully described in the Gangetic fishes, but the drawings having been retained with the author's extensive collections of papers in every department of natural history at the library of the botanic garden, no figures of them were given to the public by BUCHANAN, and unfortunately CUVIER and other ichthyologists only adopted such of his species as were figured in the work referred to.

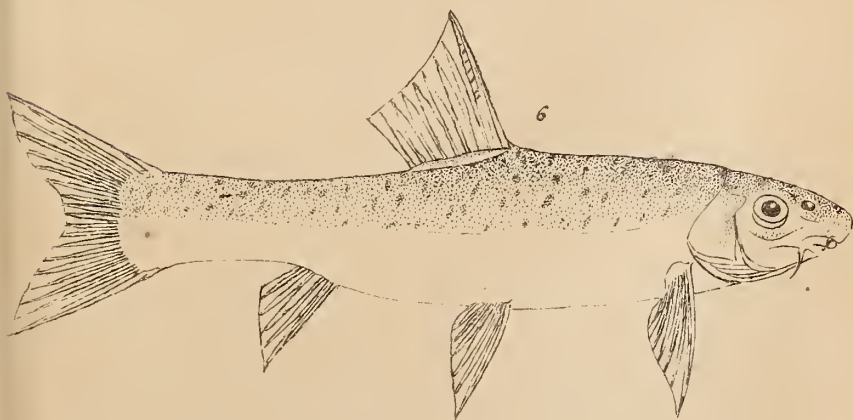
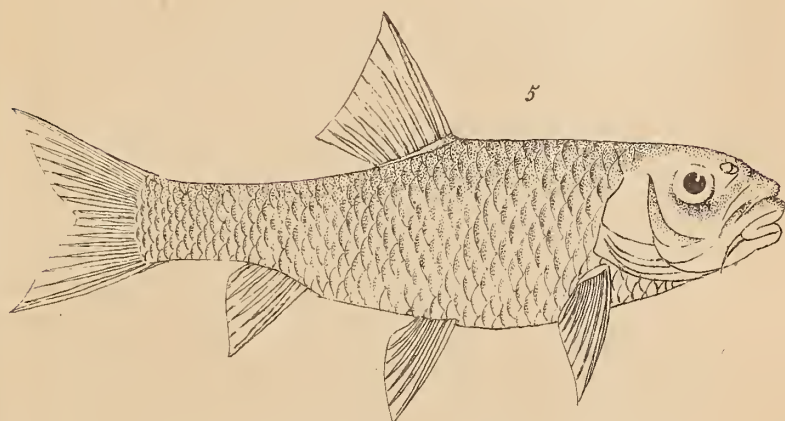
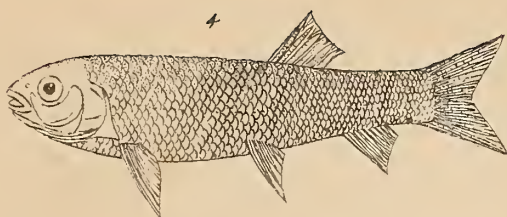
#### CYPRINIDÆ.

One dorsal fin, stomach without cæcal appendages, branchial membrane with few rays.











I. *Sub-fam.* PÆONOMIÆ, J. M.

Herbivorous.

Mouth slightly cleft, either horizontal or directed downwards; the stomach is a lengthened tube continuous with a long intestinal canal; colours plain, branchial rays three.

1. Gen. *Cirrhinus*. Lower jaw composed of two short limbs loosely attached in front where, instead of a prominent apex there is a depression; no spinous rays in the dorsal, lips soft, fleshy, and furnished with cirri.

Sub-gen. *Labeo*, Cuv. Cirri small or wanting.

2. Gen. *Barbus*. Lower jaw composed of two lengthened limbs united in front, so as to form a smooth narrow apex. Dorsal fin preceded by a strong bony spine, lips hard, four cirri, intermaxillaries protractile.

Sub-gen. *Oreinus*, J. M. Mouth vertical, lower jaw shorter than the upper, snout muscular and projecting, suborbital plates concealed.

3. Gen. *Cyprinus prop.* Body elevated, lower jaw short and rounded in front, lips hard, thick, and without cirri; dorsal long.

4. Gen. *Gobio*. Dorsal placed over the ventrals and like the anal short, and without spines. Lower jaw shorter than the upper, and either round or square in front; lips thin and hard.

5. Gen. *Gonorhynchus*. Mouth situated under the head which is long and covered with thick integuments. Body long and sub-cylindrical, snout often perforated by numerous mucous pores. Dorsal and anal short, opposite, and without spines.

II. *Sub-fam.* SARCOBORINÆ, J. M.

Carnivorous.

Mouth directed upwards, widely cleft and horizontal, with a bony prominence more or less distinct on the symphysis of the lower jaw, serving as a prehensile tooth. Colors bright, disposed in spots and streaks, or displaying a uniformly bright lustre. The stomach is a lengthened sack ending in a short abdominal canal. Branchial rays three.

1. Gen. *Systemus*, J. M. Intermaxillaries protractile; dorsal and anal short, the former opposite to the ventrals. Body elevated and marked by two or more distinct dark spots. Diffuse bright spots either on the fins or opercula, prominence on the jaw obscure; scales large.

2. Gen. *Abramis?* Cuv. Body short and elevated, a short dorsal is placed opposite to the ventrals, anal long. Intestine of the only Indian species short as the body.

3. Gen. *Perilampus*, J. M. Head small, obliquely elevated above

the axis of the body. Dorsal opposite the anal which is the longer fin ; apices of the jaws raised to a line with the dorsum which is straight, while the body below is much arched. Sides often streaked with bright colors, particularly blue, abdominal tube small, and little longer than the body.

4. Gen. *Leuciscus*. Dorsal small, opposite the ventrals, mouth and head horizontal and placed in the axis of the body, scales and opercula covered with a silvery pigment.

5. Gen. *Opsarius*, J. M. Mouth widely cleft ; body slender and usually marked with transverse green bars or spots. Dorsal small, without spines and placed behind the middle ; anal long. Intestinal canal very short and extending straight from the stomach to the vent.

### III. Sub-fam. APALOPTERINÆ, J. M.

Body elongated ; sub-cylindric, and enveloped in mucous ; all the fin rays soft ; intestines short. Branchial rays vary from two to six.

#### 1. Gen. *Pæcilianæ*, SCHN.

Sub-gen. *Aplocheilus*, J. M. Head flat, with the eyes placed on its edges, and the mouth broad and directed upwards, with a single row of minute teeth placed along the edges of the jaws ; caudal entire.

2. Gen. *Platy cara*, J. M. Head flat, with the eyes placed on its upper surface, fins thick and opaque. Pectorals large, anal small, caudal bifid, mouth without teeth and directed downwards. Stomach and intestine form a continuous fleshy tube little longer than the body.

3. Gen. *Psilorhynchus*, J. M. Muzzle elongated and flattened, eyes placed far back on the edges of the head, mouth small and suctorial, without cirri, opercula small, caudal bifid, dorsal opposite to the ventrals.

#### COBITIS, LINN.

Head and body elongated and little compressed or elevated, the snout is long, directed obliquely downwards, and projecting slightly in front of the mouth, which is surrounded with short muscular filaments.

4. Gen. *Cobitis propria*, J. M. Caudal entire, large, and ornamented with bars or spots ; prevailing colour various shades of brown disposed in more or less dense nebulae.

5. Gen. *Schistura*, J. M. Caudal bilobate, prevailing colors green, usually disposed in zones and cross-bars.

It would be unnecessary here to offer any remark on the foregoing outline of the arrangement to which I have resorted in this family, with the view of introducing our Indian species to such groups as might harmonise with those of the Regne animal. This task however easy it may seem was one that could only be attempted after long study in



India, since CUVIER himself in referring such of BUCHANAN's species as are figured in the Gangetic fishes to his groups, generally misplaces them even according to his own principles, for want of sufficient information regarding their forms, to say nothing of habits and structure; and there can be no doubt that if CUVIER had been possessed of sufficient knowledge of our Indian species he would have subdivided the family and characterised its groups nearly as I have done.

In collecting materials I have hitherto been chiefly indebted to Mr. GRIFFITH. I have now however to acknowledge my obligation to Dr. MACLOED, Inspector General of H. M. hospitals, whose collection consists of six different kinds caught promiscuously in the streams at *Sinla*, and these form as many species not before known, thus promising an unprecedented accession of undescribed forms in this quarter, as well as along the whole line of the *Himálaya*, when a more diligent search has been made for them: and it is this circumstance that induces me to publish these species at once, rather than keep them back for the more copious details of the family now in course of publication. To those who are desirous of contributing to this interesting branch of natural history, which has been hitherto so much neglected, or I should rather say, suppressed in India, I may remark that specimens are always more satisfactory than drawings, however carefully executed; that larger fishes may be skinned and prepared with arsenical soap as easily if not more so than any other animals, and that the smaller kinds, provided not more than half a dozen be put in a quart bottle of good bazar spirits, will keep during a journey in the cold season from the most distant parts of India. Should specimens exceed the size of the finger, their skins may be thrown into spirits in which state the chance of their arriving safe will be more secure; notes regarding their habits and the parts removed will render such specimens of still higher value.

*Fam. CYPRINIDÆ, Cuv.*

*Sub-fam. PÆONOMINÆ, J. M. Gen. Barbus.*

Species, *Barbus Chielynoides*\*, J. M. Pl. LVI. f. 2. As. Res. XIX.  
Pl. LVII. f. 5.

Length of the head to that of the body as one to two and a half, intermaxillaries protractile, lips round, smooth, and thick with four cirri. Branchial rays large, and ascend behind as high as the base of the pectorals; the suborbital bones are concealed beneath thick integuments. The body contracts suddenly in depth under the base of the dorsal and over that of the anal fin, 33 scales in length along the lateral

\* From *Χελυνοιδης*, that has thick lips.

line, each marked with a black spot at the apex, and nine in an oblique row from the base of the ventrals to the dorsum. The fin rays are D. 10, the three first spinous, united and smooth, P. 16 small, V. 9 larger than the rays of the pectorals, A. 7, C. 18.

The stomach and intestine form a small continuous canal equal to about thrice the length of the body.

Habitat, mountain streams at *Simla*†.

The blunt form of the head and general sculpture of the body, the size and markings of the scales afford a resemblance to *Cyp. chedra*, BUCH. (*Leucis-brachialus*.)

*Sub-gen. OREINUS\**, J. M.

The following species of this sub-genus which Dr. MACLOED obtained at *Simla*, corresponds in its general characters with *Barbus guttatus*, J. M. As. Res. XIX. Pl. XXXIX. f. 1. before obtained by Mr. GRIFFITH at *Panuka* in *Butan*, but they differ from each other in specific characters. There can be no question about the propriety of separating them from the true *Barbels*, now that a second species has been found in a similarly elevated position, 1000 miles from the locality of the first. Their spotted bodies, minute scales, fleshy snout, by means of which the actions of the mouth are entirely performed, mark them as different from the ordinary *Barbels*, while their comparatively short intestinal canal and serrated dorsal spine, remove them still further from *Gonorhynchus*.

Species, *Oreinus maculatus*, J. M. Pl. LVI. f. 3. Length of the head to that of the body as one to three and a half; body marked with shapeless spots dispersed irregularly on the back. The three first rays of the dorsal are spinous, and the third serrated behind. The fin rays are, D. 11: P. 18: V. 10: A. 5: C. 19.

Intestinal canal capacious, and forms one continuous tube with the stomach altogether about four lengths of the body, containing a copious green matter probably vegetable.

Habitat, mountain streams at *Simla*†, where it attains six or eight inches in length.

The anal fin of the *Butan* species contains ten rays, while that of the *Simla* species contains but five. The spots on the first are round and distributed over every part of the body and fins, but Mr. GRIFFITH observes, that they disappear on large individuals or become faint.

\* From *Oreinos*, pertaining to mountains.

† Found by Dr. MACLOED.

## II. Sub-fam. SARCOBORINÆ, J. M.

## 3. Gen. PERILAMPUS, J. M.

Species, *P. elingulatus*, J. M. Pl. LVI. f. 1.

Head and fore part of the body deep, humeral plates slightly exposed behind the opercula, snout round and terminates abruptly in front of the eyes; about 46 scales along the lateral line, eleven in an oblique row from the base of the ventrals to the dorsum. The prominence on the apex of the lower jaw very minute, colors plain, a minute black dot at the apex of each scale. The fin rays are, D. 9: P. 13: V. 9: A. 10: C. 19.

The stomach and intestine together form a tube about the length of the body.

Habitat, mountain streams at Simla\*—length two inches.

The only remarkable thing about this species is, that the tongue which is usually much developed and rugous in the other *Perilamps* appears to be almost wanting in this species, which may lead us to infer that it differs in habit from the *Perilamps* of the Plains which are all insectivorous.

## III. Sub-fam. APALOPTERINÆ, J. M.

2. Gen. PLATYCARA, J. M. (*Balitora*, GRAY.)Species, *P. nasuta*, J. M. Pl. LV. f. 2, a. b.

Snout abruptly depressed between the eyes with a large pit between the nostrils, body strong and sub-cylindric, about 34 scales along the lateral line and eight in an oblique row from the base of the ventrals to the dorsum. The fin rays are, D. 10: P. 16: V. 9: A. 6: C. 15.

Habitat, *Kasya* mountains†—length six inches.

This species differs essentially from either of those figured in HARDWICKE'S Illustrations, vide As. Res. XIX. Pl. XLIX. fs. 1, 2; a species corresponding, I suspect, with *Balitora maculata*, GRAY, was found by Mr. GRIFFITH in *Butan*; from that specimen, which unfortunately was much injured when it arrived in Calcutta, I have only collected a few particulars regarding the abdominal viscera in addition to the information regarding its habits obtained by Mr. GRIFFITH.

## V. Gen. SCHISTURA, J. M.

Species, *S. montana*, J. M. Pl. LV. f. 1.

Depth of the body to its length as about one to eight, six cirri and a single suborbital spine under each eye, a black streak at the base of the caudal, and about twelve broad streaks crossing the body; with one row of black dots crossing the dorsal rays, and a faint row crossing

\* Found by Dr. MACLOED.

† Found by Mr. GRIFFITH.

those of the caudal. Pectorals and ventrals long and lanceolate. The fin rays are D. 8 : P. 10 : V. 8 : A. 6 : C. 18.

Habitat, mountain streams at *Simla*\*. Length two and half inches. Species, *S. rupecula*, J. M. Pl. LV. f. 3, a. b.

About fourteen broad bars on either side, and three across the caudal and dorsal ; without suborbital spines, six cirri, four in front, and one at each corner of the mouth. The third ray from the upper and lower margins of the caudal a little longer than the outer ones. Lower surface of the body and head nearly flat, pectorals and ventrals lanceolate. The fin rays are D. 8 : P. 10 : V. 8 : A. 7 : C. 16.

Habitat, mountain streams at *Simla*†. Length two inches.

The air vessels of *Schistura* I have found in a bilobate case, rather perhaps cartilaginous than bony, placed over the entrance to the œsophagus : a magnified figure of this case is given, As. Res. XIX. Pl. LV. f. 4, while the natatory bladder of the true loaches, *Cobitis propria*, is contained in an oval bony case of only one lobe or cell (fig. 5, loc. cit.) also placed over the entrance of the œsophagus, where from its prominence as well as the minute spines with which its surface is covered it may probably perform some function connected with deglutition.

IV.—*Report upon the Coal beds of Assam. (Submitted to Government by the Committee appointed to investigate the Coal and Iron resources of the Bengal Presidency, as a supplement to their first printed report.)*

Capt. VETCH in a letter to the commissioner of *Assam*, dated 25th November, 1837, mentions having found detached specimens of various kinds of coal in the *Jellundee Belseeree*, and *Booroollee* rivers that fall into the *Bramaputra* from the *Butan* mountains between the 92° and 93° degrees of east longitude : at various distances from 14 to 20 miles from their confluence with the main river, and not far from the foot of the mountains.

The situations in which these specimens were found by Capt. VETCH are marked by the letters A, B, C, on the annexed sketch-map of the coal districts in *Assam*.

The great number of more advantageous situations in which coal has been found in *Assam* renders the question as to the quality and precise situations of the beds respectively from whence Capt. VETCH's specimens were obtained, a matter of secondary importance, but a proof so unquestionable of the existence of coal at different points for an extent

\* Found by Dr. MACLOED.

† Found by Dr. MACLOED.



of at least forty miles along the foot of the *Butan* mountains, connected with the fact of its having been discovered in a similar way by the late Mr. SCOTT on the banks of the *Teesta* river at the foot of the *Sikim* mountains, three degrees less to the eastward, tends to encourage the hope of finding coal in the lower ranges of the same chain, in some situation in which it may be available for useful purposes.

Regarding Captain VETCH's specimens, Captain JENKINS observes : " These discoveries of coal on the north bank of the *Bramaputra*, and over a tract of country 50 miles in length, appear to me to add greatly to the importance of previous discoveries of coal on the south banks of the river, for I conceive it may be presumed that we have by no means obtained a knowledge of the full extent of the coal beds in *Assam*, and that it is not improbable, that they are co-extensive on both sides of the valley, and will be found nearly throughout its whole extent."

To understand the value of the other two more useful discoveries of coal that have been made in *Assam*, subsequently to the publication of the last reports of the committee, it is necessary to examine the value in a practical point of view, of what has been previously made known on the subject.

Captain HENDERSON refers to six places at which coal had been found, indicating the existence of an extended line of coal districts from *Gowahatti* to *Bramakund*. However probable this may be, we have as yet done little to develop the fact, so as render it practically useful ; and in all inquiries of this kind, it is no less important to point out where information is defective, than it is to bring forward successful results.

If we suppose an extensive series of coal districts to exist in *Assam*, corresponding with the numbers marked on the sketch-map already adverted to, the more western beds from their vicinity to Bengal are entitled to our first consideration.

As to No. 6, however, the most western of all, and supposed to be situated on the *Kopili* river, within sixty miles of *Gowahatti*, we can find no information ; so that the existence of coal at this very desirable point rests merely on a specimen having been found in the sands of the stream by Mr. HUDSON.

Of the next coal, No. 5, we have a very clear and distinct account, as far as it goes, in a letter from Ensign BRODIE to Captain JENKINS, dated 17th May, 1837, which we can do no better than give at length. Ensign BRODIE observes—" With reference to your letter of 23rd March, I have the honor to forward you a sketch from Mr. HUDSON, showing the spots where coal has been found within this division (*Nowgong*) ;

they are three in number, but the only bed of coal the site of which is known, is that on the *Joomoona*, a little above the falls. I went to this myself during the last cold weather, and raised about 8 or 10 maunds, specimens of which I sent to you at the time. What I got did not appear to be of a very fine quality, having apparently a good deal of earthy matter mixed with it, but it is more than probable that if the vein were worked further, excellent coal would be found. The thickness of the strata is about  $2\frac{1}{2}$  feet. I laid the surface bare for some ten or twelve yards, but how far the vein extends beyond this I am unable to say. I believe no difficulty would be found in working the coal, if it ever should become an object of importance to do so. The population is certainly scanty, but then it is composed of a class of people, Mikeers and Kacharees, who can be taught, and will willingly put their hands to any thing that will afford them a moderate remuneration for their labour.

“The bed is situated at the foot of a small hill on the east side of a little nullah, which runs from the north into the *Joomoona*, about half a mile or three quarters of a mile above the falls of the latter, the distance of the coal from the *Joomoona* itself not being more than 80 or 100 yards. This river is at all times navigable to the falls by canoes, and two or three of these lashed together can take down a considerable cargo. The river is deep again above the falls, so that it is only for about 300 or 400 yards over these, that porters would be required; a boat from *Gowāhatti* would, on an average, reach the falls in 20 days, and return in 10; but this would vary with the season.

“Pieces of coal of good quality have been picked up by myself in the bed of the *Nambua*, a small stream running into the *Dhunseree* from west, but we have no information as to the position of the beds.”

The locality of these last fragments is marked No. 4 in the annexed sketch-map, and beyond the specimens picked up by Ensign BRODIE, we have no further evidence of the existence of coal at the place in question. Here then is the sum of all we know regarding coal in lower Assam: the particular part of the province in which, if found in sufficient quantity and of good quality, it would most favourably compete with the coals of Bengal in the *Calcutta* market. It is desirable therefore that the indications of coal in this quarter should be thoroughly investigated. Captain JENKINS, impressed with the importance of this, has made repeated efforts to have the district examined, and when the scientific mission was in Assam, he directed Dr. WALLICH, to detach one of the members of the mission for this pur-

# COAL LOCALITIES

*in Assam*

1857



*Names of the places  
where Coal has been discovered &c*

- N<sup>o</sup> 1. Dupha Panee
- N<sup>o</sup> 2. Namroop R.
- N<sup>o</sup> 3. Suffry or Disung R.
- N<sup>o</sup> 4. Dhunseer R.
- N<sup>o</sup> 5. Jumoona R.
- N<sup>o</sup> 6. Koppili R.
- N<sup>o</sup> 7. Chilmaree and Doorgapoor





pose, which was accordingly done, and eight days were allowed for the duty; but this period being too short, even to reach Lower *Assam* from the place at which the order was given, it is needless to say the investigation was not undertaken.

The next coal noticed in the sketch map, No. 3, is that which has been longest known, a large quantity of superior coal having been raised from this bed by Mr. BRUCE in 1828\*.

It is situated on the *Suffry*, an impracticable tributary of the *Disung*, but at what distance from the latter does not appear in the account given of the place by Mr. BRUCE, who lost several boats† in his attempt to reach the site of the coal. There is a small range of hills which offers some impediment, (but Mr. BRUCE states that it might be overcome by widening the pass,) and by the formation of a road for hackeries. Inferior coals were observed by Mr. BRUCE, crossing the bed of the stream in different situations, so that, if these last beds should be found to afford good coal, the difficulties would be considerably less in reaching it there than in the higher situation; but in so remote a part of *Assam* as this, perhaps no coal would be worth working, unless it occurred under more favorable circumstances for transmission, than characterise any of the *Suffry* beds.

The *Namroop* coal, No. 2, in the annexed map, first observed by Lieut. BIGGE and Mr. GRIFFITH, though like the last, of first rate quality, and the *Bruma-kund* coal, No. 1, found by Captain WILCOX, are probably beyond the reach of being profitably worked and introduced to the navigable part of the *Bramaputra*; so that of the six localities in which coal had been found in *Assam*, at the time the preceding reports of the Committee were written, one situation only (*Suffry*) was known, from whence coal might be obtained, and that with some difficulty, for local consumption in the province, at a cheaper rate than it could be supplied from Bengal.

Having thus stated what had been done up to the period at which our last reports were published, we are the better prepared to show the value of what has since been done in *Assam*. Coal has been found by Captain JENKINS himself at *Boorhath* on the banks of the *Disung*, the main river to which the *Suffry* coal had to be carried over so many difficulties. By this discovery therefore all these are at once obviated.

Another coal bed has been found by Captain HANNAY near *Jypoor*, about twelve miles northeast of *Boorhath*, and within three miles of

\* A sample of it was tried at the mint, and found to be equal to *Cherra Punji* coal.

† Probably canoes.

the *Boree Dihing*, also an excellent river. Full details regarding each of these discoveries, having been published in the proceedings of the Asiatic Society for February last\*, it is unnecessary to enter into them here further than concerns the extent of the beds and the quality of the coal.

At *Boorhath*, beds occur in two situations, first close to the channel of the *Disung*, at the commencement of a rising ground about a mile from the village of *Boorhath*. This bed is described by Captain JENKINS as visible for about a hundred yards in length, and eight feet in thickness, above the water and gravel of the stream.

The second bed is about a quarter of a mile distant from the *Disung*, at an elevation of about 50 or 60 feet, and exposed to the extent of 200 yards in length in the bank of a little water-course. It was not visible in continuous masses, being concealed here and there by rubbish fallen from above, but it cropped out, says Captain JENKINS, at intervals, and always seemed to bear a thickness of several feet. The coal in both these beds appeared to Captain JENKINS to be of first rate quality, and nothing could well be more favorable than the position for working, nor for the transport of the coal as far as the waters of the *Disung* admit, but this stream is barely navigable for laden canoes of small size in the dry weather, although in the rains it has a depth sufficient for large boats, and its stream is no where impetuous†.

The situation of this coal is about 50 miles from the confluence of the *Disung* with the *Bramaputra*, so that laden boats might descend during the rains with ease from the coal beds to the great river in three days, and return in six. The point at which the *Disung* joins the *Bramaputra* is about 180 miles above *Gowahuttee*.

The *Jypoor* beds are described in a letter from Captain HANNAY to the commissioner of Assam, under date 1st February, 1838‡: Cap-

\* Journ. 1838, pp. 169 to 368.

† Journ. 1838, p. 169.

‡ Journ. 1838, p. 368. In a subsequent letter to Major WHITE, dated 15th September last, Captain HANNAY gives the following particulars regarding the manner in which the coal occurs, and how he raised it:—"The vein which I excavated is situated one and a half mile in a southeasterly direction from *Jypoor*. It lies close to the right bank of a small nulla, which winds its way into the plains and has its rise in the small hills which run along the foot of the *Naga* mountains. The bank is not steep, and for a distance of from three to four hundred yards it is tolerably straight, rising gradually from 80 to 100 feet in height from the spot where the vein is first visible: for a distance of 30 yards the direction is about 205°, when it turns to 190°, and is visible further than it has been excavated by me. Proceeding onwards, however, in a direction of about 160°, and at a distance of two furlongs, you pass over a bed of greyish coloured soft shaly sandstone, strongly impregnated with petroleum, and a little further on there are several springs of this mineral oil issuing out from the description of sandstone abovementioned, and in

tain HANNAY states in this letter, that since his arrival at *Jyppoor* he discovered several beds of workable coal, and having been directed to forward a few hundred maunds upon which to calculate for trial, had already commenced clearing a large vein about two miles distant. "As I wished the open spaces the surface of the ground is covered with clay-shale and coal, well trodden down by herds of deer and elephants. A little farther on in the same direction, you come upon another rivulet, running west, and intersecting a vein of coal which is probably a continuation of the one worked by me, and it is here visible in a mass of eleven feet in height and as many in breadth. My observations on this vein did not extend farther than this, but on proceeding down the nulla, and also in the southerly direction about six furlongs distant, there are several veins of coal trending in a direction of  $335^{\circ}$ , the line of dip being  $280^{\circ}$ , and at an angle of  $45^{\circ}$ , thus dipping directly into the centre of the hillocks. I could not work on what (in miner's phrase) is termed the face of the mine, without being at considerable expense in removing such a mass of upper soil, for which I had not a sufficient number of the requisite implements, and I was consequently obliged to work directly down upon the vein, and from this circumstance, added to the tender nature of some portion of the coal, there was unavoidably a good deal of waste. The annexed sketch will perhaps shew more distinctly the situation of the vein and its accompanying strata. The method I adopted in digging was as follows. Having cleared away the surface soil, I ascertained the exact stratification of the sandstone, and having dug in the direction of the partings to the depth of 16 inches or two feet, I cut with axes to the same depth across the vein, and the blocks thus turned out, I raised by means of wedges, levers, &c. the best way I could. As might have been expected, I did not find the coal of an equally good quality throughout, at least with regard to *hardness* and compactness of texture, that which was uppermost being much impregnated with ochery earth, whilst under this lay the *hardest* and *finest* specimens, the blocks breaking off large, and the fracture exhibiting that beautiful iridescence said to be common in Newcastle slaty coal. Below the last-mentioned description, and as far as I dug down into the vein, *which might have been about six feet*, the coal was of a softer nature, intermixed however with many lines of hard, thus exhibiting the variety of fracture found in coal, the trapezoidal, and rhomboidal mixed in the harder with cubical fragments, and the whole exhibiting what is called by miners "bright heads," having the white shaly concretions and rusty scale visible in every fracture. The structure of the whole vein is cubical, but the outer layer of coal to the left is somewhat different from the rest, the texture of it being the same throughout, and its fracture being exactly similar to that of a slice of wood cut from the stem of a tree, and then broken in a contrary direction. It is not so thick as the other layers, and, there is no intervening shale between it and the tough clay which lies upon it. This layer is also much impregnated with mineral tar, which has an aromatic odour, and in several of the masses of coal belonging to it I found a rich yellow-coloured fine clay, having the appearance of orpiment. It will be observed by the accompanying sketch, that I had no hard or rocky substance to encounter, which is a great advantage, both with regard to expense and facility in working; I only worked the coal to the extent of 15 yards in the length of the space, and six feet in depth, and although I found a good deal of ponderous slaty substance, much impregnated with pyrites, on which pick-axes struck fire, still I did not come upon rock; and to all appearance the vein of coal may extend many yards farther down. The breadth of the vein, including the partings, is about 9 feet, and the loss in digging must have been about one-third of the whole quantity excavated. On examining the beds of two small water-courses which



to collect the coal at as little expense as possible," Captain HANNAY observes, "I selected the vein nearest to *Jypoor*, and before I came to this determination, I employed myself in exploring the neighbourhood; and have been very successful in finding coal and iron in great plenty." As the sample, consisting of 224 maunds, has not been found of so good a quality as the *Assam* coal that had been previously sent down to Calcutta from the *Suffry* beds, we have annexed in the preceding note the whole of the details given by Captain HANNAY of his operations.

It would perhaps have been better, on such an occasion, if samples of different kinds had been transmitted, rather than a selection of that which from its hardness seemed to be the best; indeed it may be doubted if hardness in coal denotes a superiority, and if the circumstance, noted by Captain HANNAY, of the bed becoming somewhat softer the deeper the excavation was carried, be not a very favorable sign.

We are not however to expect that a first sample, from the outcrop we may say, of a single bed in a new and extensive coal field, should be of a first rate quality. The only fault of the sample of this coal selected by Captain HANNAY is, that it contains a considerable quantity of sulphur, which, from trials made at the mint, appears to render it unfit for annealing silver, and that 40 maunds are only equivalent to 32 maunds, of the variety of *Burdwan* coal in use at the mint at the time, for getting up steam. Captain FORBES is, however, of opinion, that this sample of *Assam* coal would be found nearly as good as *Burdwan*, when burned in the comparatively small furnaces of the boilers of steam-vessels.

As far as the *Assam* coals generally have been tried, their qualities have been found to be so good, that we may regard the small cargo transmitted to Calcutta by Captain HANNAY, as chiefly valuable in showing the facility with which the article may be raised and transported. Captain JENKINS, in enclosing the bill of expenses incurred in raising and transmitting a boatload of *Jypoor* coal to Calcutta, observes: "I need not point out to the Committee, that this attempt to work the coal beds in the neighbourhood of *Jypoor* has been made under very unfavorable circumstances; the greater part of the last dry season had passed away before Captain HANNAY was able to commence operations;

pass over the vein of coal, and which come from the summit of the hillocks, I found several beds of sandstone of the description called by the miners whitepost; it is soft, and easily broken, and was intermixed with large masses of iron ore, and soft red sandstone, and there were also two small veins of coal, which although several feet higher than the larger vein evidently appeared to belong to the same bed, having the same dip and bearing. In the beds of these water-courses, and also throughout this low hilly tract, there are found large pieces of petrified wood, round pieces of white quartz and worn fragments of mica slate, having quite the appearance of a salt mine."



indeed the rains had commenced prior to any coal being brought from the mine; but notwithstanding this drawback Captain HANNAY succeeded in raising 1050 maunds of coal, and conveying to the mouth of the *Boree Dihing* upwards of 800 maunds, the whole expense on which amounted to 96 rupees 5 anas 6 pie : so that the coal has been brought down to the confluence of the *Boree Dihing* with the *Bramaputra* at something less than 2 anas a maund\*."

*Boorhath* and *Jypoor*, the places at which the coal beds just noticed are situated, are laid down in the annexed sketch-map between No. 3 and No. 2; the advantages of the former beds over the latter in regard to situation may also be seen on this map, the *Jypoor* river joining the *Bramaputra* 18 miles higher in *Assam* than the river on which the *Boorhath* coal would have to be carried. Besides this, the *Jypoor* coal is situated from  $1\frac{1}{2}$  to 3 miles from water-carriage, while boats may approach at *Boorhath* to the mines. Nevertheless, these differences are so slight, that a preference to one or other locality must depend on its comparative healthiness, on the quality of the coal, and on the general capabilities of the place.

Of the healthiness of *Assam* generally people now begin to form very favourable notions compared with Bengal; and *Boorhath* and *Jypoor* are said to be situated in one of the finest quarters of the province. In the present state of things, perhaps, the *Boorhath* and *Jypoor* coals are only to be regarded as the elements of local improvement; the intercourse between *Upper Assam* and other parts of India must assume a better footing, before its coals could be supplied to Calcutta at a cheaper rate than Bengal coals, but whether the former might not compete with the *Bardwan* coal in the supply of the depôts on the Ganges, unless the present prices of the latter can be considerably reduced, and whether it would not be advisable, considering the local improvement to which such an arrangement would give rise, to adopt measures for supplying the Gangetic steamers from this quarter, even though no direct saving were at first to be expected, may deserve consideration. Such a question, it is not perhaps the business of the Committee to examine into; still it is one of so much importance, and so intimately connected with the practical results of its proceedings, that we may be pardoned for alluding to it in detail.

\* In concluding this letter Captain JENKINS observes,—“It gives me much pleasure to bring to the notice of Government through the Committee, the zealous manner in which Captain HANNAY, at considerable risk and trouble, has co-operated with me, not only in this instance, but in every other, where an attempt has been made to develop the resources of the eastern districts of *Assam*.”

The rates at which the following stations are supplied under the present contracts, which will expire on the 26th of July next, are as follows :

Cutwa,.....Rs.	55 8	per 100 mds.	Colgong, ...	70 0	per 100 mds.
Berhampoor,...	56 0	ditto.	Rajmehal, ...	67 0	ditto.
Kulna, .....	54 0	ditto.	Mongeer, ...	74 0	ditto.
Commercolly,	64 0	ditto.	Danapoor,...	80 0	ditto.
Surdah,.....	70 0	ditto.			

Average, Rs. 67-7-6, or 654 rupees 11 anas per 1000 maunds\*. But as the *Bhagarutty* and *Sundurbun* courses are only used alternately by the regular steamers, the quantity of coal consumed annually at the four first depôts, can only be equivalent to the quantity consumed at two of the others, the true average price of the coal consumed will therefore be Rs. 67-13-2, per 100, or 678 rupees 13 anas 8 pie per 1000 maunds. Considering the proximity of the two first depôts, *Cutwa* and *Berhampoor*, to the *Adji* and *Rajmehal* coals, and the *Kulna* and *Commercolly* depôts to *Sylhet*, the most economical arrangements, that could be made for their supply, would certainly be with persons connected with the mines in each of those districts, who might be requested either to furnish tenders, or to make such other arrangements, by way of experiment, as might seem most sufficient, for securing so small a supply as that required on the *Bhagarutty* and *Sunderbun* lines†.

\* NOTE by Captain JOHNSTON. These charges include the landing, storing and delivering the coal from the depôts to the steamers, and all loss by defalcation or other causes. The contractors are not paid for the quantity of coal they dispatch, but only for that which they deliver, free from dust and small coal, on board the steam-vessels.

† Mr. LEWIN of *Cherra Poonji* offers to deliver coal into boats at five per cent. on the cost of doing so, and Mr. GEORGE LOCH, collector of *Sylhet*, who communicated Mr. LEWIN's offer to the committee, proposes himself to find boats for the transmission of the coal to any depôt at which it may be required, and thinks the service which this would confer on the district would induce any collector at *Sylhet*, should he be removed, to do the same. See on this point the report annexed to this article.

Regarding the *Adji* coals Mr. ERSKINE observes in a letter, dated 6th November, 1838, to the coal committee : " It would be impossible to say how much coal might be got down to *Cutwa* during an average season, and it would be equally rash to give a tender for the supply of a stated quantity, or to depend on such a contract, till the navigation of the *Adji* had been put to the test of experiment." In another part of the same letter Mr. ERSKINE remarks that, " Government could not depend on a larger supply than 10,000 maunds in one season, till the navigation of the *Adji* had been tried," and then states that " if 40 rupees per 100 maunds could be offered for the *Sheergurh*" (which is the best *Adji*) " coal, a much larger supply might be brought to *Cutwa* than that abovementioned, by employing carts to bring down the coal to the lower *Adji ghats* during the dry season, making the carriage from thence in boats less precarious." Mr. ERSKINE adds, that he should be happy himself to

This would leave the higher stations to be supplied on a separate contract from *Bardwan*, or any other source from which it might be done cheapest. The average charge for coal at the five depôts from *Surdah* to *Danapoor* is at present 72 rupees 3 anas per 100, or 721 rupees 14 anas per 1000 maunds.

The entire consumption for the past year has been about 91,000 maunds, on the whole line from *Calcutta* to *Allahabad*, but should the number of steamers be increased, the expenditure of coal must also increase in the same proportion, and the supply would in such case become, in every sense, an object of more importance.

Boats of any draught would have a favourable current throughout the year from *Disung Mookh* on the *Bramaputra* to *Surdah*, with the exception, during the dry season, of about 80 miles from *Jafirgunj* to *Surdah*, they would thus be enabled to reach *Surdah*, one of the depôts for coal, in about one month, or say, six weeks from the date of leaving the *Disung* river. Returning unladen for fresh cargoes, they would be about two months, thus making three trips in the year with the greatest ease, inclusive of the time required for taking in and discharging cargo.

The following are the rates at which boats are hired by the commissariat for the conveyance of public stores, and, though higher perhaps than those which merchants pay, may be taken as established charges, at which any extent of tonnage may be had. The boats required for this duty should each carry at least 1000 maunds\*.

Hire of boat, at three rupees per 100-maunds burden, per mensem,.....	Rs. 30
1 mangy, at 5 rupees per mensem,.....	5
15 boatmen, at 4 rupees each, .....	60

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 95

undertake the delivery of coals at *Cutwa* for a year, by way of trial, should no one else offer to do it on more favourable terms. The *Rajmehal* coal discovered by Mr. PONTET, will, that gentleman thinks, cost at *Berhampoor* about six anas per maund; but further particulars require to be known regarding it, before any reliance could be placed on receiving supplies from this bed.

\* Note by Captain JOHNSTON.

"I believe this is for the measurement of the boat; a boat of 1000 maunds will not carry more than 6 or 700 maunds weight." The weight which boats may carry depends a good deal on rivers and seasons. In March and October it might be necessary to load boats lightly, but at other periods coal boats from *Assam* might be laden if necessary to within six inches of the water, having such fine rivers to navigate; but if a 1000-maund boat be too small, a 1400-maund boat might be employed instead, with the same number of men, which would make a trifling difference in expense, but would give a great advantage in the results.



or 1,140 rupees per annum, to which must be added insurance, which to *Gowahutta* is  $3\frac{1}{2}$  per cent. and there is nothing in the navigation of the *Bramaputra* for 200 miles above *Gowahutta* to increase the risk beyond that of an equal distance on the *Ganges*; insurance would therefore be on three trips 52 rupees eight anas, which added to the annual cost of the boat and men, gives 1192 rupees eight anas. To this sum must also be added the original cost of raising and conveying the coal from the pits to the *Bramaputra*, this according to Captain HANNAY's experiment is two anas per maund, which for 3000 maunds would be 375 rupees, making in all for 3000 maunds of coal delivered on any part of the *Ganges*, from which three trips might be annually made to *Assam*, 1537 rupees 8 anas, or 512 rupees 8 anas per 1000 maunds, being 209 rupees 6 anas less than the rate at which the depôts from *Surdah* to *Danapoor* are now supplied\*.

\* Major HENDERSON remarks, that the calculation here entered into does not provide for incidental expenses, including clashies' establishments, wastage, landing charges, custody, all which would somewhat increase the expense, though not very considerably: Captain JOHNSTON therefore makes it out as follows:

Boat hire of 3000 maunds of coal, as per above statement,.....	Rs. 1140 0
Cost of 3000 maunds of coal, at two anas per maund,.....	375 0
Insurance, at three per cent., .....	45 0
Loss on coal by two removals and twelve months storing, 300 maunds.	
Landing charge on 3000 maunds, .....	22 8
Reloading and delivering 2700 maunds, at one rupee per 100 maunds, .....	27 0
Sirkar and peons' wages for twelve months, seven and five rupees,.....	144 0
Ground rent and expense of shed, at six rupees per mensem, .....	72 0

Total cost of 2700 maunds of coal delivered to steam boat, .. 1825 8 or ten anas nine pie per maund nearly. This calculation, which certainly omits nothing that could be necessary, while other things are probably overrated, still leaves an advantage of one ana three pie per maund, in favor of the rate at which *Assam* coal might be supplied to the station, from *Surdah* to *Danapoor*, compared with that now paid by the government for *Bardwan* coal for those stations.

The loss on coal by moving it from place to place varies according to the nature of the coal and the number of removals; the latter cause would be at its minimum in the *Assam* coal, as the same boat that would take it up in *Assam*, could deliver it at the depôt for which it might be intended, and where it is not necessary it should remain a year in store. A sirdar and peon moreover would not be necessary for every 2700 maunds of coal, but for all at the depôt, which might be 20,000 maunds; the boatmen would be responsible for the coal on board their own boat, and, being measured out and into the boat, there would be no room for cheating. It is also too much to charge the entire expense of a shed to 2700 maunds, when the same shed would answer for all the coal required at the depôt. Both statements however show that the *Jypoor* and *Boorhath* coals might be introduced to the higher stations on the *Ganges* with considerable advantage; and if free passage to emigrants were offered in the return boats, with the prospect of employment, the present paucity of labourers in *Assam* would soon be remedied.



Perhaps the most important results from opening coal mines in *Assam* for the supply of Gangetic steamers, until more convenient sources should become better known than at present, would consist in the assurance of an unlimited and steady supply at all seasons, and the widening of the field for competition, while the attention of natives being directed to a new and promising branch of trade, the measure would contribute largely to the local improvement of the province.

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To the above account of the coal fields of *Assam* it may be useful to add some further information collected by the committee in respect to the coal of *Cherrapoonjee* and other parts of the hills north of *Sylhet*, and likewise respecting the coal field on the *Koela nulla* near the *Soan* river in *Behar*. The information in respect to the former mines is in the shape of replies obtained from Mr. G. LOCH, the deputy collector of *Sylhet*, to queries addressed to him by the committee for the purpose of ascertaining the possibility of turning the coal of that district to account in steam navigation: and similar queries were addressed to the Engineer of the steam service, Mr. TYTLER, at *Danapur*, in order to ascertain the same points in respect to the *Soan* and *Koela* coal field. The queries and the replies are given as they were received.

I. *Sylhet coal*, G. LOCH, Esq. B. C. S. Deputy Collector,  
*Sylhet*.

1st. "How many situations are there in your neighbourhood at which good coal is known to be raised, and what is the distance of the mines from the nearest navigable rivers?"

1st. There are three, *Cherrapoonjee*, *Sirareem*, and *Lour*. The coal of the last mentioned place is inferior to the *Bardwan*, but the vein is close to a small river navigable for dingees during the rains. *Cherra* is eleven miles from *Pandua*, to which place boats of 500 maunds can proceed during the rains; but it is necessary to bring the coal from *Terriah-ghat* at the foot of the hills to *Pandua* in dingees, a distance of four miles. The *Sirareem* vein has never been worked, and is farther in the interior of the hills, four or five miles from *Cherra*.

2nd. "What are the situations at which depôts might be most conveniently established? for what period would these depôts respec-

tively be accessible for ordinary boats of a certain size? would any particular boat be desirable and what is the probable expense per maund of delivering the coal at the nearest depôt accessible to large boats?"

2nd. *Chattuk*, on the river *Soorma* near the mouth of the small river which runs past *Pandua*, is best situated for a depôt, and is approachable at all times of the year by the common country boats of 500 maunds, which it will be best to employ for conveying the coal. The price of coal is likely to vary at *Cherra* from 20 to 22 rupees per 100 maunds; and as it will be safer to calculate upon the higher price the following will be the average cost of delivering at *Chattuk*.

100,000 maunds of coal at 22 rupees per 100 maunds, Co.'s	Rs. 22,000
A salary, of three per cent. on the price, to the contractor or agent at <i>Cherra</i> , .....	600
Expense of building a depôt for the coal, .....	200
Conveying coal from <i>Soorma-ghat</i> to <i>Chattuk</i> , at two rupees per 100 maunds, .....	2000
	<hr/>
	24,800

Thus the rate of delivery at *Chattuk* would be three anas eleven pie or four anas per maund. I annex a statement showing the expense of conveying, and the price of delivering the coal, at the several stations mentioned in your letter.

3rd. "Are any parties now working the coal mines in your vicinity, and what is your opinion as to the best mode of proposing for tenders, or otherwise providing for the future supply of coal for river steamers from mines in your neighbourhood, and what your opinion generally as to the best way of bringing such coal into use after July next, when the present contracts will expire?"

3rd. The Kasyas are the sole workers of the *Cherra* vein. That of *Lour* was worked for a short time by Mr. G. INGLIS of *Chattuk*; but the coal being inferior could not compete with the *Bardwan* in the market, and he gave up the attempt. No contracts can be made with the Kasyas for a continued supply of coal, for without some one to look after them, and to see their engagements fulfilled, they would never have the coal at the foot of the hills, in sufficient time. Each supply ought to be bargained for on the spot, and I would recommend, as mentioned in my letter to you of August last, that an officer be appointed to contract with the Kasyas for the necessary supplies, and that he should receive

as a salary, either three per cent. on the price of the coal, or what will be better fifty rupees per mensem. His business would be to see that the coal was brought to the foot of the hills, and to report when the required quantity was ready for despatch. The detail of the business can easily be settled by us, should this arrangement meet your committee's approbation, and the sanction of government. That some such arrangement is necessary is obvious, for it would be impossible for me to leave my station and present duties, to go to *Cherra* to make contracts, whenever a new supply of coal was required, which could not even then be procured without constant supervision. I was assisted by the kindness of a friend at *Cherra* when I made the last successful experiment, and I wrote to a gentleman settled at *Cherra* on my return from Calcutta, begging to know whether he would agree to the following terms. To purchase the required supplies of coal, and to receive a percentage on the price or fifty rupees a month. To find the purchase money himself, and not to require repayment till the whole supply had been delivered at the foot of the hills, leaving the coal to be forwarded to its various destinations by the collector of *Sylhet*, or any other officer who might be authorized, for his own health would not permit him to come down to the plains. He stated in reply his inability to find the purchase money, but he is willing to take upon himself the task of forwarding the coal, and as he has been resident some time in the hills, he is likely to get it as cheap as any one else. The great object is to have some one to look after the Kasyas; the money might be supplied from the *Sylhet* treasury, and as long as I remain in the district, I shall be happy to use my best endeavours in forwarding the coal to any place, and assisting the views of the committee.

It will now be a difficult thing, and attended with greater expense to have the coal ready at the different stations, particularly at those above *Mongir* and *Danapur*, by next July. *Allahabad* is about two and a half or three months' journey from this, and it will take some time in getting the coal to the foot of the hills;—there is now but little water in the small river that runs by *Terriah-ghat*, and the coal would have to be carried in canoes to *Pandua* and thence to *Chattuk*. These canoes are cut out of a single tree, and not capable of carrying more than twenty or thirty maunds; without money I can do nothing, and unless I have orders to draw on the collector of *Sylhet* for the necessary sum immediately, another month may be lost. I will, however, make the attempt, and accompanying is a statement showing what would be the probable expense.

The stations lower down the river than *Colgong* and *Rajmehal* can be supplied in time, when the rains commence in April next, if the coal is now brought down.

4th. "Your opinion is also solicited as to the most convenient locality for establishing a general depôt for the supply of the following stations from coal mines in your vicinity, with a view to facility and economy in procuring boats. *Cutwa, Berhampur, Kulna, Commercolly, Sardah, Colgong, Rajmehal, Mongir, Danapur, Ghazipur, Mirzapur, Allahabad.*"

4th. If a depôt is to be established on the *Ganges*, the committee will be the best judges of its locality. It would be convenient to have one at some central station, or where boats might be easily procured, to which coals from *Chattuk* might be sent according to the annual demand. The cost of carrying coal from *Sylhet* will then be fixed, and the price of delivery will not vary very much, depending of course on the rate at which it can be procured at *Cherra*, which at present varies from twenty to twenty-two rupees per 100 maunds. But it will be necessary to consider whether the cost of carriage from the central depôt to the various stations will not increase the price of the coal more than if sent direct from *Sylhet*; of this I am no judge, not knowing what is the expense of water-carriage on the *Ganges*. From the accompanying statements the committee will be able to decide, which is the cheapest method of forwarding the coal, and if I have not allowed sufficient time for a journey to and from the various stations, calculating from Calcutta, the error can easily be remedied by allowing another month's boat-hire.



Rs.	
Price of 100,000 mds. at 22 Rs. {	22,000
per 100 maunds,.....	}
Salary to local agent at 50 Rs. {	600
per mensem,.....	}
Expense of conveying the coal {	2,000
from Terriah-ghat to Pandua, {	200
Expense of building a depôt,	24,800

*Statement of the probable cost  
of Sylhet coal at the different  
Depôts.*

Rs.	
Price of one 600-maund boat for 1 month {	18
at 3 Rs. per 100 maunds,.....	}
1 Maunj at 4 Rs. ....	4
6 Dandies at 3 Rs. each, .....	18
	40

1	2	3	4		5	6	7	8	9	10	I
Station to which coal is to be despatched.	Distance from and to Sylhet.	Quantity of coal required.	No.	Boat of 600 mds.	Price of coal per maund on delivery at Chat-tuck depôt.	Total price of coal at Chat-tuck depôt.	Expense of carriage to various stations.	Total of columns 6 & 7.	Rate for 100 maunds on delivery.	Rate per maund on delivery.	
Cutwa, .....	1	8000	16	112	anas.	1984	0	0	0	0	A. P.
Berhampore, .....	1	8000	16	112	4	1984	0	0	0	0	5 10
Kulnah, .....	1	8000	16	112	4	1984	0	0	0	0	5 10
Commercolly, .....	2	8000	16	112	4	1984	0	0	0	0	5 10
Sardah, .....	2	8000	16	112	4	1984	0	0	0	0	6 6
Colgong, .....	2	8000	16	112	4	1984	0	0	0	0	6 6
Rajmehal, .....	3	8000	16	112	4	1984	0	0	0	0	6 6
Mongyr, .....	3	8000	16	112	4	1984	0	0	0	0	6 6
Dinapore, .....	3	8000	16	112	4	1984	0	0	0	0	7 9
Ghazepore, .....	4	8000	16	112	4	1984	0	0	0	0	7 9
Mirzapore, .....	4	8000	16	112	4	1984	0	0	0	0	9 1
Allahabad, .....	5	12000	24	168	4	2976	0	0	0	0	15 6

G. LOCH,

Depty. Collector.

I have distributed the coal to the various stations in these propositions, in order to give some idea of the expense of purchasing & forwarding it. The Committee will of course give the instructions regarding the quantity of coal required at each station.

II. *Soan and Koela coal field.* W. B. TYTLER, *Superintending Steam Engineer at Danapur.*

1st. "How many situations are there in your vicinity, at which good coal might be raised, and what the distance of the mines from the nearest navigable rivers?"

1st. The coal with which I am acquainted is situated on the *Soan* river, between *Rahtas Gurh* and *Palámow*, and might be advantageously raised near *Surdra* on the *Amanath* river; another good situation will also be found at *Hatar*, where the coal is of a very fine bituminous quality, equal to any I have examined in this country.

2nd. "What are the situations at which dépôts might be most conveniently established? for what period will these dépôts be respectively accessible for ordinary boats of a certain size? whether is any peculiar form of boat desirable or necessary, and what is the probable expense per maund of delivering the coal at the nearest dépôt accessible to large boats?"

2nd. I would propose *Seebpur* as a general dépôt, situated at the junction of the *Soan* with the *Ganges*, near *Danapur*; it will be found a central and convenient spot, accessible to large boats at all seasons of the year. I would also propose to establish another dépôt at *Ghane-ghat*, where large boats would be obstructed from passing up the *Soan* during the months of October, November, December, January, February, March, April, May, and June.

From *Ghane-ghat* downwards to *Seebpur*, boats of about 500 maunds might ply throughout the year, but above that point smaller size boats would be desirable, owing to the shallowness of the river. In my opinion square punts or lighters, similar to those employed on the Thames for conveying coal, would be of great use, as the quantity of coals they would convey would be greater than that of any other craft known in this country. The expense I estimate the coal at after it has been laid down at *Seebpur*, would be six to eight anas per maund.

3rd. "Whether any parties are now engaged in working coal mines in your neighbourhood? and what is your opinion as to the best mode of proposing for tenders, or otherwise rendering the coal in your vicinity available for river steamers?"

3rd. I am not aware of any of the mines having been as yet opened by any other person than Captain SAGE, the executive officer of *Danapur*, who some years ago brought from 12 to 1600 maunds to this station for brick burning, &c. &c., and he speaks very highly of the quality. I am of opinion that any mode of inviting public competition for a

supply of coals from mines not yet in operation, would not be found to answer so well, as by the government giving in the first instance a grant of land wherever the mines are situated, and by afterwards making advances on a private contract, to the parties holding the grant, for a permanent supply of the coal to the dépôts, where it would be desirable to lay it down for the use of the river steamers.

4th. "The committee would feel much obliged by your answering these questions at your early convenience, and favouring them with your opinions generally as to the best and most economical way of introducing any coal with which you may be acquainted in the neighbourhood of *Danapur*."

4th. In the first instance we have to take into consideration all the obstacles to the undertaking in view; in the second, the best means of overcoming such obstacles, should they exist. As to the practicability of procuring coal from the beds in the *Palamow* district, I have never entertained any doubt; but whether we may be able to produce the article of the quality and in the quantity required, we are not certain: although the whole mass of information, to which I have access, would tend to confirm the opinion, that the mines will not only be productive, but will require but little excavating of soil, and clearing, in raising the coal to the surface.

Until operations have commenced, and have been continued for some time, it would be rash to dwell too much on such a doubtful subject as mining is well known to be, but as to the natural advantages, and facility of communication either by land or water, we can speak with more certainty: a few most important points must be kept in view to ensure success. First, the quality of the coal on the surface cannot always be allowed to point out the best spot to open; and second, an elevated point of the beds must be sought for the obvious advantage of running off waste water; third, a spot as near the deepest navigable river as possible, will be an important consideration; and, lastly, a spot combining as many of these advantages, together with a thick stratum of coal to work on, where a mine is opened, will also require to be attended to.

As to the navigation of the *Soan* river, I do not apprehend any great difficulty, except in very dry seasons; and to obviate this a great quantity of coals ought always to be kept in store at the general dépôt. We should require to use boats of a size proportionate to the depth of the water found in the rivers, and to be regulated in all the arrangements, as economy may dictate from time to time.

## V.—Ancient Inscriptions.

Dr. A. BURNS' *Kaira Tamba-patra*, No. 1.

When we gave, in the past month, a translation of No. 4, of the *Tamba-patras*, of which transcripts and facsimiles were obtained from Dr. A. BURNS of *Kaira*, we were not aware that one of the same precise description had previously been communicated by Mr. Secretary WATHEN, and was printed with an exact copy of the plate in the number of this Journal for September, 1835. We were led to refer to that article by finding in the oldest of Dr. BURNS' grants, that marked No. 1, by him, the name of SILADITYA, and other princes of the Valabhi race from SENAPATI BHATARKA downwards.

Our present grant confirms the order of the reigns given by Mr. WATHEN from his *Tamba-patras*, and affords additional dates and circumstances, of high interest to those who occupy themselves with such studies. Mr. WATHEN's order of the Valabhi or Balhara dynasty is as follows :

WATHEN. BURNS' grant.			WATHEN. BURNS' grant.		
1	1	BHATARKA SENAPATI.	8	4	SILADITYA, I.
2		DHARA SENA.	9	5	CHARA GRIHA, or ISH- WARA GUHA.
3		DRONA SINHA.	10	6	SRIDHARA SENA, II.
4		DHARUVA SENA, I.	11	7	DHARUVA SENA, II.
5		DHARA PATTAH.	12	8	SRIDHARA SENA, III.
6	2	GUHA or GRIHA SENA.	9		DHARUVA SENA, III.
7	3	SRIDHARA SENA, I.	13		SILADITYA, II.

Of these rajas, the four following BHATARKA are omitted in the present grant, it being simply stated that from BHATARKA, the founder of the family, was sprung GUHA SENA or GRIHA SENA, the former is our reading. From this prince however we have the genealogy complete, and with the simple introduction of DHARUVA SENA, III, our ninth in order, and the author of this grant, the series corresponds with that of Mr. WATHEN in every particular. The genealogical tree which our present grant enables us to frame from GUHA or GRIHA SENA will stand as follows :



## 1 BHATARKA.

From whom  
 descended

2 GUHA OR GRIHA SENA  
 whose other name was  
 GANDHARBA RÁJA.

3 SRIDHARA SENA.

4 SILADITYA OR  
 \*KRAMÁDITYA.

5 ISHWARA GUHA,  
 called by Mr. WATHEN  
 CHARA GRIHA.

9 DHARUVA SENA III.

OR DHARMADITYA. 6 SRIDHARA SENA II. 7 DHARUVA SENA II.

8 SRIDHARA SENA III.

Now the first thing to be observed is, that the grant translated by Mr. WATHEN purports to be by SRIDHARA SENA; that we now present is by DHARUVA SENA, the sixth in succession after him; of course therefore Mr. WATHEN's is the most ancient; but though there were six successions to the gadi, these must have been of less than the ordinary duration, for the minister who prepared the grant in SRIDHARA SENA's reign was SKANNA BHATTA; whereas the minister who prepared the present grant is named as MADANA HILA, son of SKANNA BHATTA; thirty or forty years will therefore be the probable interval occupied by the reigns of all the princes, named as having intervened between SRIDHARA SENA the first, and DHARUVA SENA the third.

Another important fact results from the date of our present grant, which is clearly 365 Sumbut, and which must be the Sumbut of VIKRAMÁDITYA; corresponding with A. D. 309; but Mr. WATHEN assigns to SRIDHARA SENA, DHARUVA SENA's grandfather, the date A. D. 328 or 384 Sumbut. He has been led to this conclusion by supposing the words  $\text{N}\gamma\text{ṭ}$ , which he reads "Sumbut" with the figure "9," to have reference to the Valabhi æra, ascertained by Col. TODD to have commenced in

\* Perhaps VIKRAMA'DITYA but the VI is wanting in the transcripts.

A. D. 319. But there is no word whatsoever in the grant to warrant a reference of this Sumbut to that æra, and it seems much more natural to suppose the Sumbut, or year, to be either the Sumbut of VIKRAMADITYA with the figures effaced, or merely to have reference to the year of SRIDHARA SENA's accession. If the figure which follows the word Sumbut be indeed a 9, (it is not very plain) there is nothing to prevent the year of the reign of that sovereign being indicated thereby, as has been usual with many rājas, and as was practised even by rāja KISHEN CHUND of *Nudea* within the last sixty years. Assuming therefore thirty years for the interval of the son's succeeding SKANNA BHATTA as minister, the proper date of Mr. WATHEN's Tamba-patra, will be 279 A. D. and that of SRIDHARA SENA's accession 270 A. D. The date upon Dr. A. BURNS' grant, examined from the facsimiles taken off in printing ink, is clear, so as to admit of no doubt of the figures, or of its being the Sumbut of VIKRAMADITYA that is referred to\*.

The translation of this Tamba-patra is given entire, and nearly literal, from a transcript made by Mr. JAMES PRINSEP, the pandit KAMALAKANTA, aided by the Sanskrit College student SÁRODÁPROSÁD, having rendered it for us into English.

The character of the original exactly corresponds with that of Mr. WATHEN's grant, of which a facsimile has been already published, so that we are saved the necessity of having a separate plate prepared to exhibit it.

†१२ सुखि विजयिषुस्तचरितार्थात् वीरासनप्रसभप्रणतामित्रात् मि  
त्राणामतुलवलसम्पन्नमदलाभसंसक्तप्रणिधिपरलब्धप्रतापात् प्रतापोपन  
तदानमानार्जवोपा ॥ ३ ॥ र्जितानुरागादनुगतमौलोभूतश्रेणिवलावाप्त  
राज्यश्रियः परममाहेश्वरभटार्कादादित्यवद्भानो राजवर्यादजनि माता  
पितृचरणनखेन्दुधोरणिप्रविधौताशेषकलुषः ॥ ३ ॥ गान्धर्व्यादिविद्या

\* Since the above was sent to press, a letter has reached Calcutta from Mr. WATHEN at the *Cape of Good Hope*, dated 16th October last, which, after expressing great interest in the discoveries made from the Asoka inscriptions, concludes as follows: "My impression was, before I left India, that I mistook the Sumbut in the Gujrat Inscriptions, and that it is that of VIKRAMADITYA." This singularly confirms the conclusion we had come to, from comparison of the date in this No. 1. grant of Dr. BURNS; and would seem to show that the year of the grant of SRIDHARA SENA, translated by Mr. WATHEN, was in his opinion erased, and that the imperfect figures in the plate are not to be read as the figure 9.

† The numbers indicate the lines of the copper plate.

द्वितीयः वान्धवैकशरणपरगजघटास्फालनप्रकाशितसत्त्वनिचयप्रताप  
 प्रणीतारातिदत्तरत्नप्रतापसदुपादानधनसंहतिः सकल ॥ ४ ॥ स्थिति  
 प्रणीतमार्गपण्यपरिपालनप्रजासुहृद्रक्षणगन्धर्वराजशब्दाभिधेयः सभ्यस  
 म्भाव्यवृद्धपपत्तिः स्वरशशाङ्काधिकराजदतिमृदुवाकगती ॥ ५ ॥  
 त्रापयनः शरणागतभयप्रदानपरतया तृणवदपास्तविषयव्यापारोऽर्थ्यर्थ  
 नाधिकधनप्रदानानन्दितसुहृत्प्रजाहृदयः सदाचारादिसकलादेश ॥  
 ६ ॥ भागप्रमेयः परममाहेश्वरः श्रीगुहसेनः तस्य सुतस्तत्पादनखमयूख  
 सन्ताननिःसृतजाह्नवीजलौघप्रक्षालिताशेषकल्मषः प्रणतिशतशृङ्खला ॥  
 ७ ॥ पजीव्यमानसंघप्रलोभादिवाश्रितः सरभसमाभिगामिकैर्गुणैः  
 सहजशक्तिशिक्षाविशेषविस्मयितविश्वधनुर्धरः प्रथमनरपतिसमोति  
 श्रियानामनुपालयिता ॥ ८ ॥ यागधर्मदयानामपाकर्तृप्रजापघात  
 कारिणामुपस्रवानां दण्डयिता लक्ष्मीसरस्वत्योरेकाधिवासः संहताराति  
 पक्षलक्षपरिभेददक्षविक्रमो ॥ ९ ॥ विक्रमोपसंप्राप्तविमलपार्थिवश्रीः  
 परममाहेश्वरः श्रीधरसेनस्तस्य सुतस्तत्पादानुध्यातः सकलजगदानन्द  
 नात्यद्भुतगुणसम्पदुदयशशिभयशः ॥ १० ॥ संवृतदिङ्मण्डलः समरशत  
 विजयशोभनयशोमण्डलांशुद्युतिभासुरायोधिजनगुरुमनोरथमहाभारः  
 सर्वविद्यापरापरविभागा ॥ ११ ॥ भिगमविमलमतिरपि सर्वतः  
 सुभासितभुवनोपि सुखोपपादनीयपरितोषः समस्तलोकभोगगामि  
 हृदयोपि सुचरितातिशयसुखात्मा ॥ १२ ॥ परमकल्याणस्वभावशीलः  
 भूतकृतयुगन्तपतिपथविशोधनोदग्रकीर्तिः धर्मानुपरोधोज्ज्वलतरङ्गता  
 र्थसुखसम्पदुपसेवानिरूढः ॥ १३ ॥ [वि]क्रमादित्यद्वितीयनामा श्रीशीली  
 दित्यस्तस्यानुजस्तत्पादानुध्यातः स्वयमुपेन्द्रगुरुणैव गुरुणात्यादरवता  
 समभिलक्षणीया ॥ १४ ॥ राजलक्ष्मीः स्कन्धाशक्ता परमभक्तस्तेनधुर्य्य  
 स्तदाज्ञासम्पादनैक परतथैवोदगतखेदः सुखरतिसुमनायितसत्त्वसम्पत्तिः  
 प्रभावसम्पदशीकृतम् ॥ १५ ॥ पतिशतशिरोरत्नकायोपगूढपादपीठोपि  
 परावक्षाभिधानरसानालिङ्गितमनोवृत्तिः प्रणतिमेकां परित्यज्य  
 प्रख्यातपौरुषाभिमानैरप्य ॥ १६ ॥ रातिभिरनासादितप्रतिक्रियोपा-

यः कृतनिखिलभुवनामोदविमलगुणसंहतिप्रसभविघटितसकलकलिविल  
 सितगतिः नीचजनाधिरोहि ॥ १७ ॥ भिरशेषैर्देवैरनामृतात्युन्नतहृदयः  
 प्रख्यातपौरुषास्त्रकौशलातिशययमातिथिविपक्षक्षितिपतिलक्ष्मीश्याग्र-  
 हप्रकाशितप्र ॥ १८ ॥ वीरपुरुषः प्रथमसंख्याविगमः परममाहेश्वरः  
 श्रीश्वरगुहस्तस्यतनयस्तत्पादानुध्यातः सकलविद्याधिगमविजितनिखि  
 लविद्वज्जनमनः ॥ १९ ॥ परितोषातिशयसत्वसम्पदात्यागौदार्येण च  
 निभृतानुसन्धानसमाहृतविपक्षमनोरथक्षोभक्षः सम्यगुपल ॥ १० ॥  
 क्षितानेकशास्त्रकलालोकचरितगम्भीरभावेपि परमभद्रप्रकृतिर  
 कृत्रिमप्रश्रयविनयशोभाविभुषणः समरशतजय ॥ २१ ॥ पण्डितको  
 दण्डप्रबलोदयशरदण्डविध्वंसितनिखिलप्रतिपक्षदर्पादयः स्वधनुःप्रभाव  
 परिभूतास्त्रकौशलाभिमानसक ॥ २२ ॥ लटपतिमण्डलाभिनन्दित  
 शासनः परममाहेश्वरः श्रीधरसेनस्तस्यानुजस्तत्पादानुध्यातः सच्चरिता  
 तिशयितसकलपूर्व ॥ २३ ॥ रपतिरतिदुःसाधानामपि साधयिता  
 विषयाणां मूर्तिमानिव पुरुषकारः परिवृद्धाङ्गगुणानुराधनिर्भरचित्त  
 वृत्तिभिर्मनुरिव ॥ २४ ॥ स्वयमभ्युपपन्नः प्रकृतिभिरधिगतकलाकलाप  
 क्षान्तिमान्निर्वृतिहेतुरकलङ्ककुमुदनाथप्रभः प्रतापस्थगितदिगन्तराल  
 प्र ॥ २५ ॥ ध्वंसितध्वान्तराशितः सततोदितः सविता प्रकृतिभ्यः परंप्रत्यय  
 मर्थवन्तमतिवज्जविधप्रयोजनानुबन्धमाधनपरिपूर्णं विदधत् ॥ २६ ॥  
 सन्धिवियहसमासनिश्चयनिपुणः स्थानानुरूपमादेशकृत् गुणभङ्गिः शिस्त  
 णजनितसंसार साधुताराज्यशालागरीयस्तत्राययो ॥ २७ ॥ रुभयोर  
 पिनिष्णातः प्रकृतविक्रमोपि करुणामृदुहृदयः श्रुतवानप्यधर्मविश्रान्तो  
 पि प्रणतिस्थिरसौहृदयोपि निरसितरिपुवर्गाणा ॥ २८ ॥ मुदय  
 समयसमुपजनितजनतानुरागपरिपिहितभुवनसमर्थितः प्रथितवाला  
 दित्यद्वितीयनामा परममाहेश्वरः श्रीध्रुवसेनः ॥ २९ ॥ तस्य सुतस्तत्  
 पादकमलप्रणामधरणिक्कषणजनितकिणलाञ्छनललाटचन्द्रशकलः शशि  
 भावङ्गुश्रवणनिहितमौक्तिकमालांशुरभ ॥ ३० ॥ मामलश्रुतविशेष  
 प्रदानसलिलक्षालितवियहस्वरविन्दन्याय इव मृदुकरग्रहणादमन्दो



कृतानन्दविधिवश्वानरार्थ ॥ ३१ ॥ कर्मकोधनुर्द्धर इभसम्भाविता  
 शेषलक्ष्यकलापप्रवणात्त सामन्तमण्डलोत्तमाङ्गस्थचूडामणिविमानशासन  
 परम ॥ ३२ ॥ माहेश्वरपरमभट्टारकमहाराजाधिराजपरमेश्वरचक्र  
 वर्त्ती श्रीधरसेनस्तत्पितामहभाट श्रीशीलादित्यस्यसुतः संसर्गप्रणयि  
 भाग्यमना ॥ ३३ ॥ [लांभक्तिवन्धु] रतियोधकशतपते रतिधवलोलपलनिहित  
 पादारविन्दस्य प्रभूताङ्गमणिरुचा मन्दारकुसुमेनेव समलङ्कृतदेशसभ्य  
 स्यात्क्षीणदाक्षिण्योत्तमस्य ॥ ३४ ॥ प्रवलधवलिस्रा यशसा बलयेन मण्डित  
 ककुभः नबोदयमिलितहिमकरहृल्लोलाखण्डपरिवेशमण्डलस्य पयोद  
 श्यामशिखारत्नककुदनवद्यविभूषणस्य ॥ ३५ ॥ यूनः क्षितिपतेः श्रीवल  
 भद्रस्याङ्गजक्षितिपसन्ततेरनुरागिणीं शुचियशोभ्वजिनीभूतां स्वयंवर  
 मालामिव राज्यश्रियं प्रपेदे दिव्यमानसः कृत ॥ ३६ ॥ वामप्रतिहत  
 श्रीः[परमानमितप्रचण्डरिपुमण्डलं मण्डलाग्रमिवावलम्बमानः]शरदिन्दु  
 प्रभः स्वाकृष्णशिखो मुखबासामोदापादिप्रसाधनाननः परभूदक्रमण्ड  
 दुकरग्रहपरः रुचिरविविधवर्णग्रामाणां श्रुतातिशयेनेवोद्भासितश्रवणः  
 [पुनःपुनरुक्तेनेव] रत्नालङ्कारेणालङ्कृतश्रोत्रपरिसरः रुचिरकचकदम्ब  
 मरकतकिरणः अविच्छिन्नप्रदानसलिलनिवहावसेकविलसन्नवयौवनाङ्कुर  
 मिवाभ्रमणिमुद्वहन् [धृतविशालरत्नवलयजलधिवेलातटायमानभुज  
 परिधक्वाटवत्स्थलः] ॥ ३७ ॥ श्रीभ्रुवसेनस्तस्याग्रजः परममहीपतिः  
 ॥ ३८ ॥ परममहेश्वरः श्रीधरसेनस्तस्याग्रजः परममहीपतिस्तदुदयवत्या  
 धियेव लक्ष्म्या स्वयमतिसुखुचेतसाश्लिष्टाङ्गयष्टिरतिरुचिरतरचरितग  
 रिमपरिकलितसकलनर ॥ ० ॥ पतिरतिप्रकृष्टानुरागरसरभसवशी  
 कृतप्रणतसमस्तसामन्तचक्रचूडामणिमयूखखचितचरणकमलयुगलः प्रो  
 द्यामोदारदोर्दण्डलितद्विषद्वर्गद ॥ ४१ ॥ पसर्पः प्रदेयप्रत्तप्रीणिता  
 शेषस्वर्गिवर्गः प्रणयिक्षितिक्षिदाप्तलक्ष्मीकः प्रेरितगदाक्षिप्तसुदर्शनचक्रः  
 परिहृतापक्रियोन्नतोद्धतध्वजातिरेकविक्र ॥ ४२ ॥ मप्रसाधितधरित्री  
 तलोङ्गीकृतशरण्यस्यैर्ययुद्धपौरुषरसः साक्षाद्धर्म इव सन्धग्यवस्थापित  
 ॥ ४३ ॥ वर्णाश्रमाचार उच्चैरप्युपपत्तिभिः क्षापालव्रतचर्या ॥ ४४ ॥

निपुणः तानि देवब्रह्मदेयानि तेषामतिसरलमनःप्रीतिं विस्तारयन्  
 सजलनयनानुदिनपरिमुदितचिभुवनाभिनन्दिताकृमौक्तिकधवलधर्मध्व  
 ज ॥ ४५ ॥ विसकलितप्रकीर्णकलिङ्गवंशैर्देवद्विजगुरुन् प्रति यथार्हं  
 मनवरतप्रवरतरमहाद्रव्यादिदानव्यसनानुपजातसन्तोषोपात्तपरकीर्तिं  
 पंक्तिपरम्परादन्तुरितदिक् ॥ ४६ ॥ चक्रवालः स्वचेष्टयैव यथार्थधर्मादि  
 त्यापरनामा श्रीश्वरगुह्यस्तस्याग्रजन्मनस्तदखण्डश्रीविकाशिन्या कलावत  
 चन्द्रिकयेव कीर्त्या ॥ ४७ ॥ धवलसकलदिङ्मण्डलस्य खण्डितागुरुविले  
 पनपिण्डश्यामविन्ध्यशैलविपुलपयोधरराजश्रियः क्षौणीपतेः श्रीशीलादि  
 त्यस्य स्तूनुर्नवप्रणयकीर्त्तियोषाप्रतिदिनसम्बर्द्धमानकलाचक्रवालः केस  
 रीन्द्रशिशुरिव राजलक्ष्मीमचलवनस्थलीमिवालङ्कुर्वानः शिखण्डकेतन  
 इव रुचिमच्चूडामणिः प्रचण्डशक्तिप्रभावश्च शरदागम इव प्रताप  
 प्रफुल्लसुहृत्पद्मविशेषितारिपङ्कचयः बिलयन्नम्भोधरानिव परध्वजान्  
 उदयन्नवतपनप्रतापातपोअनलसश्रमःसमापयन्नभिमुखानामार्यूंषि द्वि  
 षतां परममाहेश्वरः श्रीशैलादित्यः कुशलीसर्वानेव समाज्ञापयत्येवम  
 स्तुवाविदितं यथामया मातापित्रोः पुण्याप्यायनाय गिरिनिर्भरविनिर्गत  
 खेटकवादंस्तुस्थितचातुर्विध्यमुमान्यतापसगात्रसत्रक्ष्यचारित्राक्ष्यण सान्द  
 पुत्रब्राह्मणनाधुक्ताय खेटककेदारे नगरकपथके देयापस्त्रिग्रामे दक्षिण  
 परसीम्नि वरुणाभिलिकवक्त्ररकेदारक[शक्ति]सिद्धक्षेत्रं रज्जुकविरक  
 पन्नखेटकमानेन श्रीहिपिदकद्वारा षड्भिः खण्डैरवस्थितं यत्र प्रथम  
 खण्डस्याप्यालानपूर्वतः ग्रामादुत्थितः रोहिणीयर्जग्रामयायी पश्या  
 दक्षिणतः दोधकसरोऽपरतः कवित्याविकग्रामादुत्थितः गण्डुकग्राम  
 यायी पश्याः दन्तुरपेचकशालिक्षेत्रं तथाद्वितीयखण्डं यस्य पूर्वतः करि  
 ल्याविकग्रामादुत्थितः गह्वर ॥ ५४ ॥ ग्रामयायी पश्याः दक्षिणतः  
 रोहिणीयर्जग्रामसीमा अपरतः तापसपत्निकाग्रामसीमा उत्तरतः र-  
 विकोणक्षेत्रं नवमिदमाप्या[दनविश्यार्द्धं]सकेदारिकभूमिकं सार्द्धक्षेत्रं ३  
 तथासुराश्चकालक्ष्योदकप्रवद्धजम्बुवानरग्रामे पूर्वसीम्नि आदित्यदास  
 भागिलकाख्या प्रकृष्टपरिखा विंशतिभूपादावर्त्तपरिसरा वापी यस्याः

पूर्वतः वराहमौणिकग्रामसीमा दक्षिणतो वृहदापी अपरतः लाभ  
 दरिल्लकप्रकृष्टक्षेत्रं उत्तरतः ब्राह्मणस्वामिकप्रकृष्टक्षेत्रं भूः खण्डाव  
 स्थितं अशीतिभूपादावर्त्तपरिमाणं क्षेत्रद्वयं १ खण्ड दक्षिणपरसीम्नि  
 दधित्यः प्रकृष्टं एकोनपञ्चाशद्भूपादावर्त्तपरिमाणं यस्य पूर्वतः दिव्यकन  
 क्षेत्रं दक्षिणतः गर्गरक्षेत्रं अपरतः भीमक्षेत्रं उत्तरतः रमसालिकाबापी  
 द्वितीयखण्ड दक्षिणपरसीम्नि विनामेश्वर प्रकृष्टं चतुस्त्रिंशद्भूपादा  
 वर्त्तपरिमाणं यस्य पूर्वतः आदित्यदासक्षेत्रं दक्षिणतः लोहारपादक  
 ग्रामसीमा अपरतः ब्राह्मणरोप्यशर्मसीमा ८८ककण्डनादीनां क्षेत्रं  
 उत्तरतः रौग्धिनदिन्नकामाप्रकृष्टगर्गक्षेत्रं नबमुदवापीसहितं सार्द्धक्षेत्रं  
 इत्थं सोदृङ्गं सोपरिकरं सम्भूत शालिप्रत्यक्षसधान्यहिरन्योदयं सह  
 सोपरोधं सोत्पद्यमानवृष्टिकं सर्वराजकीयानामहस्तप्रक्षेपणीयं पूर्वं  
 प्रत्तदेवब्राह्मणदायब्राह्मणविंशतिरहितं भूमिक्विन्न्यायेनाचन्द्रार्का ॥६२॥  
 न्वरक्षितिसरित्पूर्वतसमकालीनं पुत्रपौत्राद्यन्वयभोग्यमुपकृति स्वर्गति  
 धम्मादयोन्मिश्रं अर्चितल्लोचितया ब्रह्मदेयस्थित्या भुञ्जतः कर्षतः  
 कर्षयतः प्रदित्सतोवा[न] कैश्चित्वा ॥ ६३ ॥ सेधे वर्त्तितचं आगामि  
 भद्रवृत्तिभिरस्मदंशजैरन्यैर्वा अनित्यमैश्वर्यमस्थिरमानुष्यं सामा  
 न्यञ्च भूमिदानफलं अवगच्छद्विरयमस्मदायो ॥ ६३ ॥ नावमन्तव्यः  
 परिपालयितव्यश्चेत्युक्तञ्च । वज्रभिर्वसुधा भुक्ता राजभिः सगरा  
 दिभिः । यस्य यस्य यदा भूमिस्तस्य तस्य तदा फलं । यानीह  
 दत्तानि पुरानरेन्द्रैर्दानानि ॥ ६५ ॥ धर्मार्थयशस्कराणि । निर्भुक्त  
 माल्यप्रतिमानितानि को नाम साधुः पुनराददीत । षष्टिवर्षसह  
 खाणि स्वर्गे तिष्ठति भूमिदः । उक्तेत्ताचानुमन्ता च तान्येव नरको  
 वसेत् । एतत् कर्त्ता राजपुत्रध्रुवसेनः ॥ ६६ ॥ लिखितमिदं सन्धि  
 विग्रहाधिकृतद्रविणपतिश्रीस्वन्दभट्टपुत्रद्रविणपति श्रीमदनहिलेनेति  
 सं ॥ ३६५ ॥ वैशाख्य शु ॥ १ ॥ स्वहस्तो मम ॥

*Abstract translation of No. 1. of Dr. A. BURNS' Tamba-patras.*

Glory. From BHATARKA, the best of rulers, magnanimous as the sun, victorious, of good disposition, who obtained his power by the excellence of his intelligence, by gratifying and elevating his friends in spirit, and by obtaining all men's good opinion through donations and courtesy, who by his power maintained men in respect, and through the fidelity of his servants preserved his dominions in prosperity, and laid his enemies prostrate, sprung GUHA SENA, who obtained absolution from sin by bowing submissively to his father's feet, and who was called GANDHARBA Rāja, because of his consideration for other men, as shown by his regulation of prices, by his anxiety to protect his people and friends, and by his sacrificing high state interests to secure the safety of those who took refuge with him, who obtained popularity by giving to the poor more than they asked. None excelled him in the science of *Gandharba*. Enriched by the jewels his enemies presented in tribute, of a voice pleasant as that of Cupid and the moon, lenient in the exaction of state dues, a teacher of morals, in all observances never failing, great and powerful, as manifested by the motions of his elephants, his wisdom and sound judgment are appreciated by men of social feelings. The son of GUHA SENA, SRIDHARA SENA, likewise absolved himself from sin by submission to his father, as if he had washed in the *Ganges* water. The warriors of the universe were astonished at his strength and skill, and by his power he secured the prosperity of his kingdom. Like his ancestors, he was a protector of learned and eminent persons, and a subduer of the evil-doers and corruptors of virtue. In him only did LUKHSMI and SARASWATI (wealth and knowledge) unite. For he was alike a subduer of lakhs of enemies, and abounding with wealth, and the possessor of all acquired endowments, which sought refuge with him, like the thousands who prostrated themselves before him for their livelihood.

The son of SRIDHARA SENA, SRI SILADITYA, worshipped likewise his father's feet, and prospered. The four quarters of the world were adorned with his fame, won by merits, all delighting, all astonishing. He gave courage and confidence to his army, by acquiring for it the lustre of a reputation founded on many victories. Though possessing an intellect capable of understanding and arranging the good and bad sciences, and famed in the world for his intelligence, yet was he not fastidious; and though attentive to the wants of others, still always cheerful and contented. He was an example of the *Satya yoga* rājas in his conduct, and enjoyed happiness without any sacrifice of virtue. His second name was KRAMADITYA, (perhaps VIKRAMADITYA.)



SRI SILADITYA was succeeded as rája by his younger brother \*ISHWARA GUHA, who was dutiful and obedient, and therefore loved by his elder brother, who was honourable like Upendra. It was the study and the delight of ISHWARA GUHA to obey his elder brother's commands, and to make his own power and wealth conducive to his happiness. His footstool was bright with the jewels taken from the crowns of hostile rájas brought to subjection. Yet was he never reproachful of others. Those who opposed him in their pride were reduced to helplessness. The vices of the *Kali yoga* were forgotten through his virtues and talents. His magnanimity made him tender of the faults of others, and his heroism was apparent to all, so that the *Lukshmi* of the sovereigns he subdued and destroyed with the weapons of his wrath, took him by the hand. Great was his wealth, and unity characterised none of his qualities or attributes.

The son of ISHWARA GUHA was SRIDHARA SENA who overcame and silenced all the learned men of his age. He had the conviction of his foes' mortification and envy, because of his own power, wealth generosity and magnanimity. With the gravity of deep learning, acquired by mastery of the sixty-four Vidyas, and by acquaintance with the manners of many nations, he united cheerfulness and mildness, and by nature he was gifted with humility. By the power of his bow he subdued the pride of his enemies—his bow victorious in many battles. The rájas, overcome by his skill in weapons, delighted in their subjection to him. DHARUVA SENA, the younger brother of SRIDHARA SENA, was obedient to him, and prospered in wealth and honor, and rivalled the kings of antiquity in his conduct: many affairs of great difficulty were completed by him, and the friends he trusted and employed on great occasions, were enriched by him. He was as a sanctified hero, devoting himself to human actions; such was his attention to the minutest studies. Like SWAYAMBHU (MENU) he was endowed with all attributes—patient in learning every branch of the sixty-four Vidyas. The resource of all for counsel—beautiful as the spotless moon, and resplendent in power as the ever-rising sun, darkness was dispelled from around him. He was versed in the arts of peace and war—a deviser of schemes adapted to all purposes and occasions, having been taught by the learned the two great aims—to do good to the world, and to promote the exaltation of his kingdom. Though powerful, he was compassionate and learned, and avoided sin, and was firm in friendship with those who submitted, but prompt to repress his enemies before their prosperity gained head, thereby establishing over all people the ascendancy of a superior mind.

\* This is the rája called CHARA GRIHA by Mr. WATHEN.

The second son of DHARUVA SENA was SRIDHARA SENA, very learned, a king of kings, excelling in wealth; whose forehead, worn and reddened by the frequency of his obeisance to his father's lily feet, looked as if adorned with the crescent of the young moon. His ears were ornamented with pearls like moons, and his body was cleansed with ablution from the waters of munificence, according to the precepts of the Vedas which he never forgot. He gave delight to all, as a water-lily spreads its fragrance, by abstaining from the resumption of grants. His bow was drawn for the good of the universe, and he excelled in archery. The leaders of his enemies' armies, immediately on his mounting his war elephants, yielded submission to his orders.

The beautiful kingdom of VALABHADRA came next to DHARUVA SENA, son of SILADITYA, who was brother of SRIDHARA's grandfather, as a prize-wreath conferred by public opinion, and was to him an ensign of fame. He was the master of many armies, beautiful in person, sincere and young, and with his hair resplendent with gems, casting radiance over his courtiers, like the flower *mandāra*. His fame, bright as the full moon, delighted the hearts of all, and his lily feet were placed on white marble. He promoted the fortunes of his friends, was sincere in heart, and good to all. His face was like the autumn moon, and his hair like the streaks in an emerald. His enemies were humbled, and the kings opposed to him found their territory invaded, and were indebted to his bounty for the moderation of the tribute he demanded; by the fragrance of his breath the air which others breathe was perfumed; from his ears precious stones of various colours were pendent, like jewelled ornaments upon the volumes of sacred learning. On his breast he wore a jewel, like the sprouting shoot of his youth watered by the sanctity of his munificent donations. His elder brother was ISHWARA GUHA, whose person was embraced by LUKSHMI for the promotion of his good fortune, who excelled all rājas in conduct and in fame, who with the wand of his power destroyed the serpent of his enemies' pride, and gained over the LUKSHMI of other kings who admired him, who restrained crime, and adorned the earth with the lofty ensigns of his power, and settled the customs of the four great castes. His lily feet are adorned with the crown jewels of prostrate chiefs, subdued by love rather than by force. A refuge to all in battle, brave, and in all things virtuous, performing all the duties of royalty, and amongst them the liberal distribution of gifts to brahmans, and to the temples of the gods, from the wealth in his possession, which is to them a source of great delight. The earth was enlightened with the fame he gained by his munificence to gods and brahmans of the Ka-

jinga families, who were deprived of their *Dharmadwajja* (flag of virtue) which was white as pure pearls, and the people of the three regions shed tears of joy. The other name of DHARUVA SENA was DHARMADITYA, a name given to him only for his virtue.

The said prince\* (DHARUVA SENA) inheritor of his father's fortunes, whose dalliance is with fame as with a wife, and whose crown jewel is like the crest of a peacock, who adorns the royal LUKSHMI as a lion adorns the forests on the mountain side, and scatters his enemies as the rainy season dissolves clay; whose friends' countenances expand for joy like water-lilies, while the flags of his enemies are dispersed like clouds; powerful, diligent, of spirit like the rising sun, the destroyer of his enemies, son of SILADITYA, the elder brother of ISHWARA GUHA, who enlightens the earth with his fame like a moonbeam, and who, smearing his body with sandal-wood dust, is beautiful like the Vindhya cloud-capped mountain, proclaims to all: Be it known to all of you, that for his father's and mother's virtue's sake, he, the said son of SILADITYA, has presented to the brahman LADHULLA, son of the brahman SÁNDA, a religious student, venerable, acquainted with the four Vedas, who lives in the villages situated near the hill fountains, the fertile field called *Varunam Bilika Vakkara Kadārakā*, situated near another field, and on the road, southwest of the village named *Dya Palli*, having had the same measured by HIPIDAKA with a measuring rope. The field is divided into six portions.

(Here follows a minute description of the boundaries, which need not be given.)

The above land, with its tanks and hillocks, being of the measure of half a kshetra, is to be enjoyed in full property as a perpetual inheritance by the said LADHULLA, his sons and posterity for ever, so long as the sun, the moon, the earth, the rivers, and the mountains shall endure. It is productive land and capable of rearing valuable grain.

Let not the hands of the king's servants touch it, nor let any one claim it on the part of the gods and brahmans by whom it was heretofore possessed.

"To give land," &c. &c., (here follows the usual quotation in favor of donors and in execration of resumers of grants.)

This grant is executed by order of DHARUVA SENA, son of the king SILADITYA, by his faithful servant for peace or war, keeper of his

\* The word for prince in the original is *Sailaditya*, which I am assured is a legitimate patronymic from SILADITYA. It is evident that DHARUVA, the son of SILADITYA, is meant from the closing sentence of the grant.

treasury, MADANA HILA, son of SKANNA BHATTA, in the year Sum-but 365 (A. D. 309) on the first day of the light half of the month of Bysakh.

On the seal, SRI' BHATARKA under a bull, as in Mr. WATHEN'S grant, for which see vol. IV. page 475.

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VI.—*Information regarding Illanoon Pirates. By Captain BLAKE, H. M. S. Larne.*

In the course of the past year, Capt. STANLEY, H. M. S. *Wolf*, with the *Diana* steamer in company, fell in with a fleet of pirates in the act of attacking some Chinese trading vessels, and having rescued these, the steamer followed, and by its rapid pursuit and well-directed fire captured and destroyed several of the pirates. The prisoners taken on this occasion were carried to *Singapore* for trial, and the Malays were convicted and executed, the facts being such as to prove that the fleet attacked had committed more than one act of piracy, before the British vessels fell in with it. But amongst the prisoners were some *Illanoons*, and it appearing that many of these pirate vessels were of that nation, the Recorder who tried the case would not pass sentence of death upon them, owing to some doubts which arose, as to whether they might not be acting under commission from the Sooltan of *Sooloo*, or from some other recognised prince of that part of the Archipelago. Very little information was procurable as to the political character and circumstances of these *Illanoons*. But they were not wholly unknown, for in the year 1822 it was this same class of pirates who attacked the *Seaflower*, and Mr. FULLERTON, then governor of P. W. Island, was disposed to have sent an expedition for their chastisement, but was restrained by the government of Bengal. There is also an imperfect mention of this race in Mr. MOOR'S recent compilation of notices regarding the Indian Archipelago, which contains the intelligence collected by Mr. HUNT regarding the *Sooloo* Islands in 1814: but the information procurable was altogether so defective, that it was determined to take the occasion of any one of H. M. vessels of war proceeding to the vicinity, to ascertain further particulars regarding them. Captain BLAKE, of H. M. S. *Larne*, found the opportunity of making the desired inquiries, and the following report from that officer is the result. It has been communicated by His Excellency the Naval Commander-in-Chief to the Governor General, and by His Lordship's orders is made available for publication in this journal.



TO Sir FREDERICK L. MAITLAND, K. C. B.

*Rear Admiral and Commander-in-Chief.*

SIR,

In compliance with your memorandum of this day's date, to "report to you any information I may have been able to obtain during my stay at *Manilla*, respecting the state of piracy in the *Sooloo Sea*," I beg to inform you, that on the arrival at *Manilla*, about two days before my departure, of some *Singapore* papers, containing the particulars that transpired at the trial of the "Illanoon" pirates at *Singapore*, lately captured by Her Majesty's sloop *Wolf* and the Honorable Company's steamer *Diana* off *Tringana*, I sought an interview with Don JOSE ARCONI a post captain in the Spanish royal navy, and Don VILLASICENZIS his assistant, two officers who have been employed for some years in watching and suppressing piracy amongst the southern group of the *Philippine Islands* and *Sooloo Sea*, and I may observe that the former officer, while I was at *Manilla*, received his promotion from Spain for his exertions on this service.

It appeared from their statements, that the "Illanos," as they call them, are a distinct race of people, inhabiting the line of coast comprised within the bight of the bay of that name in the island of *Mindanao*, the shore of which is there one continued line of mangroves and swamp, and which soon communicates with an immensely extensive inland lake. This lake they consider as their stronghold and their home, and these people are termed by the Spaniards "Los Illanos de la Laguna." Here they build and repair their prahus, which they convey to and from the sea by means of ways or platforms constructed of bamboo and ratan and placed on the unsolid surface of the mangrove roots and branches, over which their prahus are hauled to and fro. On this lake too they have their wives or females in the prahus, in which they live, and in short, here they carry on all intercourse with each other as an insulated and distinct community. Born and bred in a life of piracy, they look on it merely as a means of living, and not as a criminal occupation. For this reason they meet with nothing that escapes their attack in the shape of native vessels of those seas; but I was especially assured, and all accounts seem to confirm it, that they are quick and intelligent in the extreme, in discriminating and instantly avoiding a canvas sail, or any vessel of European appearance; and so dexterous are they, that they in a moment lower mast and sail, and are hauled in among the mangrove shores with which the innumerable islands thereabouts abound; and though the *Manilla* government maintains a constant establishment at different points of *Mindanao*, especially at *Samboongan*, it is but rarely that their

falucas, or (gun-boat launches) succeed in capturing any of the "Illanos." Two of them however were surprised and secured in the early part of this year, and their crews amounting together to about sixty were in prison at *Manilla*. As they were not captured in any act of piracy they are merely kept as prisoners, but what their ultimate destination may be I know not.

The distance to which the "Illanos" extend their cruizes is shewn from the late capture off *Tringana*: but I was much surprised, when pointing this out on the chart to the Spanish officers abovementioned, at their assuring me, that they had no doubt the pirates made their round south of *Borneo* to the coast of *Siam*; that there is a pirate tribe on the north end of *Borneo*, daring and atrocious as themselves, between whom and the "Illanos" exists, and always has existed, a most deadly and unextinguishable enmity, and that the latter will never pass by the northern route. If these two tribes of depredators do meet, a most sanguinary conflict ensues, and I was assured, that either of them will even quit their plunder to attack the other, and thus prefer the gratification of feelings of hatred and hostility. The object from which the "Illanos" derive their principal booty in their cruizes, is the captives they make and sell on all parts of the eastern and southern coasts of *Borneo*, and in the *Macassar* straits. To this they principally direct their attention, after they have supplied themselves with a sufficient number to pull at the oar and do the other work of their prahus.

They seldom cumber themselves with any thing from the cargo of a capture, save gold dust or other valuable goods.

Though other descriptions of pirates infest those seas, the "Illanos" are always known from the peculiar construction and dexterous management of their prahus. A drawing of one of them was shewn to me, which minutely corresponded with the description given of the one captured off *Tringana*.

It has been supposed that these "Illanos" are subject to and act under the directions of the rája of *Sooloo*, but I was most positively assured by the Spanish officers mentioned above, as also by His Excellency Don ANDRES GARCIA CAMBER, governor of *Manilla*, that such is not the case. Captain Don JOSE ARCONI has had some communication with the rája of *Sooloo*, and is acquainted with his situation, his means and his habits. He assured me that the rája had neither means, power, nor influence over these "Illanos;" that they are a race purely piratical, of a distinct community of wild ranging predatory habits, dependent on no one, and acknowledging no external authority. It is true they frequent the island of *Sooloo* as they please, quite unmolested,

and without hindrance, as well as the other innumerable islands and mangrove banks (called by us the *Sooloo* islands), supposed to be subject to the *rāja's* sovereignty. One of these, called "*Bong een ghee*," eastward of *Sooloo*, is a principal resort for them, as it affords convenience and facility for their piratical pursuits. It is principally mangrove growing upon coral banks, and is well calculated for protection and secure concealment.

I was informed by Don JOSE ARCONI, that he had witnessed at one time nearly two hundred "*Illano*" prahus, great and small, off this island, and on attempting to chase them with his "*Falucas*," they outstripped all pursuit, and disappeared in the most extraordinary manner, dousing masts and sails, and taking refuge among the mangroves. He compared these haunts to extensive nests, or banks of rats, where they can fly from one refuge to another, and which no means, we Europeans here possess, could ever succeed in annihilating.

The island of *Baselan*, I was also informed, is a common resort of the "*Illanos*," and some of its inhabitants are pirates from their birth, and it is not unusual for them to identify themselves with the "*Illanos*." Although the whole *Sooloo* group is subject to visits from them from time to time during their cruizes, they are in the habit of resorting to no other fixed points except "*Baselan*" and "*Bang een ghee*," the first of which is an island of very considerable size. They generally obtain their supplies of ammunition, &c. by trafficking with places of their acquaintance, which are in communication with the various small Dutch settlements on the coast of *Borneo* and the islands.

The boldness and audacity of the "*Illanos*" cannot well be exaggerated. They have been known to enter the bay of *Manilla*, passing the signal station on the island of *Corregidor*, where two gun-boats are generally stationed, and to capture boats or small vessels within the bay. This I believe was proved on the late trial by two boys, who were captured by them in a boat off *Cavite*, about eight miles from the city of *Manilla*. From the "*Loguna*" which they inhabit in *Mindanao*, they have been known not unfrequently to push a passage in their prahus out to the northward by a small river which runs from the lake into the sea at "*Cay-gain*," where there is a Spanish settlement, a fort, and always a company of soldiers, whose random fire from musketry, after they have got clear, they have ridiculed by loud shouts and wild yells of defiance. If they have reason to suspect that a particular look-out is kept for them when on their passage to seaward by the Spanish falucas stationed at *Samboangan* and its neighbourhood, their quickness and penetration are incredible. They will move their

prahus with caution along the edge of the mangrove banks by night, even for ever so short a distance, and haul them into an impenetrable concealment ere the dawn of day, and at last gain their object by persevering in their progress night after night, while look-outs are kept constantly on the edge of the mangrove banks unseen during the day.

The Spanish officers confessed to me, that their attempts to capture them were almost uniformly foiled by their quickness, cunning and sagacity; and strange as it may seem, these extraordinary marauders, acknowledged foes to all they meet, through the advantage of locality, their own adroitness, the peculiar construction of their prahus, and other natural circumstances so favorable to their lawless pursuits, maintain in spite of every thing a constant intercourse with their home the *Laguna*, almost without interruption.

It may not be irrelevant here to mention, that a treaty (so called) was concluded between the rája of *Sooloo* and the late acting governor of *Manilla*, SALAZAR, about two or three years since; this treaty is however proverbially ridiculed at *Manilla*, as having been made with an individual ignorant of the faith or meaning of a treaty, a mere cypher, nominally a rája, but possessing no control over his subjects who regard not his authority and yield him no allegiance. This may tend to confirm the assurances made me, that the rája of *Sooloo* possesses not a shadow of power or influence over the community of the "Illano" pirates.

The foregoing details are recited from memory, but are the true substance of information I gathered, during a long verbal communication, over charts, with the two very intelligent Spanish naval officers before mentioned: and though they may not throw much additional light on the information already abroad on the subject of piracy in the *Sooloo* sea, they certainly tend to confirm, or explain some remarkable points of the evidence, that transpired during the late trial of the "Illano" pirates at *Singapore*.

I have, &c.

(Signed) J. J. BLAKE,  
Commander.

Her Majesty's Sloop *Larne*,  
*Toong-koo Bay*, 13th Aug. 1833. }



VII.—*Proceedings of the Asiatic Society.**Wednesday Evening, the 5th December, 1838.**Present.*

The Right Rev. LORD BISHOP of Calcutta, V. P. in the Chair.

MESSRS. H. T. PRINSEP, EWART, HARE, Col. D. McLEOD, Captain PEMBERTON, Major GREGORY, Lieut. MONTRIOU, Dr. EVANS, Dr. McCLELLAND, Dr. SPRY, visitor, and Dr. W. B. O'SHAUGHNESSY, Officiating Secretary.

The proceedings of the last meeting were read and confirmed. The Secretary rose to return thanks to the Society for the honor conferred on him by his nomination as one of their Secretaries during the absence of Mr. JAMES PRINSEP. He also informed the meeting, that pursuant to the arrangement made with Mr. MALAN for conducting the duties in the Oriental Department, they would carry on a new series of the *Journal of the Asiatic Society*, after the current year.

Dr. GOODEVE and Mr. R. O'SHAUGHNESSY were proposed by the Secretary, seconded by Capt. PEMBERTON.

Read a letter from Professor OTTOMAN FRANK of Munick, acknowledging his election as an honorary member.

Read the following extract of a letter from Major TROYER to the address of Mr. JAMES PRINSEP.

*"Paris 31 Rue de la Madeleine, 15 July, 1838.*

*"My dear PRINSEP,*

*"I had the pleasure of writing to you a month ago in answer to the most valuable account which you gave me of what has been done by you with respect to the copying of the Vedas for the French, and communicated to Mr. SALVANDY, the minister of Public Instruction. In answer to it, he ordered that an annual sum of 1500 francs be sent to you, (JAMES PRINSEP,) until the completion of the whole work, that is until the whole mass of Vedas be copied. You will undoubtedly receive an epistle from him on the subject. This will be the continuation of a great trouble to you, but I have the pleasure of assuring you that the service which you render by it to all those who take an interest in Sanskrit literature and in Indian antiquities will be duly appreciated. Be pleased to correspond upon the matter as hitherto with me, and I will not fail to be your faithful reporter to the French minister of Public Instruction. I am forwarding to you with this a letter from BURNOUR, who will, among many other things, tell you, that the decoration of the legion of honor is to be offered to Mr. HODGSON of *Nepaul*, as an acknowledgment of the trouble which he took in procuring and sending to *Paris* important Sanskrit manuscripts belonging to Buddhism, which religion appears to grow every day in extent and antiquity. You will be very sorry to hear of JACQUET's death, at the age of twenty-eight years. You will be able to judge yourself what hopes have been buried with that learned and uncommonly active young man.*

*"BURNOUR is beginning to print the Bhagavat purana with a French translation. You will, before the arrival of this letter, have received a large chest of books sent you by Mr. CASSIN, Agent to the Asiatic Society of Paris. I can but recommend you once more to send your Journal, and every oriental work to be sold, directly to Paris, addressed to Mr. CASSIN, Agent de la Société Asiatique de Paris, Rue de Casanni, No. 12. The sale will be effected better than it can be in any other way, for it is not easy to a great number of persons on the continent who may wish to buy oriental works, to procure them from London, whilst they may easily get them from, or in, Paris."*

(Signed) A. TROYER.

Read extracts of a letter from M. GARCIN DE TASSY, dated Marseilles, 11th September, 1838, acknowledging receipt of catalogue of Arabic, Persian and Oordoo works belonging to the Asiatic Society. M. DE TASSY's letter gave cover to a prospectus of his work on Hindustani literature. The prospectus with a list of subscribers is printed in the number of the Journal of the Society for November.

Read extracts of letters from M. E. BURNOUR, Secretary, Asiatic Society of Paris, in acknowledgment of several numbers of the Journal of the Asiatic Society.

Read an application from HERAMBANATH THAKOOR, applying for an increase of his salary.

Resolved, that the application be referred to the Committee of Finance to settle the amount.

On the suggestion of the President, seconded by the Secretary, Mr. W. GRANT was proposed a member of the Statistical Committee.

In pursuance of a letter addressed to the Society by Mr. Secretary MACNAGHTEN, read on the 10th October last, regarding the interchange of publications with his Highness the Pasha of Egypt, the Secretary apprized the meeting that he had forwarded a set of all the Arabic publications printed by the Society to his Highness the Pasha of Egypt, and likewise certain Arabic books selected by Mr. PRINSEP and purchased by Government for the use of the institutions established by his Highness.

#### *Library.*

The following books were presented.

On the primary forces of electricity, by RICHARD LAMING, M. R. S.—*by the Author.*

Proceedings of the Geological Society, Vol. II. No. 56—*by the Society.*

Notice sur des Vetements avec des Inscriptions Arabes, Parsanes et Hindustani, par M. GARCIN DE TASSY—*by the Author.*

Meteorological Registers for September and October, 1838—*by the Surveyor General.*

Lardner's Cabinet Cyclopaedia—History of England, Vol. 8—*from the booksellers.*

The officiating Secretary laid before the meeting a printed list of the Members of the Society, prepared by Mr. JAMES PRINSEP.

Resolved, that the copies be distributed among the Members.

Read a letter from the Right Rev. JOHN LEWIS, Bishop of Isauropolis and Vicar Apostolic of Bengal, forwarding a copy of his publication of the Cochlin-Chinese and Latin and Anamitan Dictionary, and requesting the Society to apply to Government for 100 copies of the Anamitan part of the work, besides the 100 copies already offered by the Author.

Resolved, that an application be made to Government for the purchase of the additional copies, as requested by the Bishop of Isauropolis.

#### *Literary and Antiquities.*

Read a letter from Captain F. DASHWOOD, Assistant Secretary to the Military Board, intimating that the principal commissary of ordnance has been requested to send the Buddhist stone pillar, on its arrival from *Delhi*,

to the Society, being a present announced at the meeting held on the 7th February last, from the Maha Rajah HINDU RAW.

Read a letter from H. T. PRINSEP, Esq., Secretary to the Government of India, forwarding copies of the Inscription and a tin roll of the remaining facsimiles of *Girnar*.

Read extracts of letters from M. EUGENE BURNOUF, Secretary to the Royal Asiatic Society of Paris, to Mr. JAMES PRINSEP, dated Paris 15th May, 1838. M. BURNOUF notifies the despatch of copies of his commentaries on the Gaina, and of the first and second parts of his *Memoirs sur les inscriptions cunéiformes*. The price of the Gaina is 65 frs ; of the inscriptions 20 frs. M. BURNOUF then writes—

“ I have just seen in your Journal the proposal to publish lithographs of the caves of Western India ; I beg to be added to the list of subscribers for a work of such high interest, and one which ought to be imitated in all parts of India. It is scarcely comprehensible that the ancient monuments of a country so entirely subject to your government should have been so much neglected. DANIELL'S views are immeasurably too dear, and are not sufficiently comprehensive.

“ I have seen your (*charmant travail*) on the famous Pali inscription. The fact is of the highest importance, and you have acquitted yourself so as to deserve the utmost honour. Doubtless some difficulties still remain, of which I think the most serious is the name of the king of *Ceylon*. But other inscriptions will probably annihilate this difficulty ; you are now in the high road of discovery and we have every thing to hope from your persevering and prosperous efforts. We are far from making such swift and brilliant progress. We want monuments and have philology alone to study. Still even in this there is room for discovery in all that concerns religion, philosophy and literature—although even such must yield in striking interest to historical disclosures. The task of commentary and interpretation of the ancient texts is tedious and dry, but it must be persevered in. We must be supported by the hope, that these ancient words and forgotten forms may be found again on monuments and coins, and thus lead to the understanding of these valuable remnants of a venerable antiquity.

“ The Mahabharat still prospers. I induce ‘*tout le monde*’ to purchase copies, by affirming positively (which I believe to be true) that in 10 years this fine monument of antiquity will not be procurable. The truly remarkable sale of this work is a certain unequivocal indication to your Society of the duties it has to discharge, and which are expected from it by the learned of Europe—doubtless you will not find purchasers for every *Vade mecum* and every work in Sanskrit, Arabic, Hindi, and Bengali which your translators may convert from the English ; but I assure you that you will dispose of the Mahabharat, however voluminous it may prove, and that you would ere this have exhausted the Vedas and Puranas, if you, or rather the former Committee, had undertaken them instead of the *Mitakshara* and similar short treatises on law, which will very soon find no readers in Europe. But in the great productions of ancient thought—in the vast monuments of Indian genius, in such there is immense interest. Despite of the progress of industrialism, (I mean no offence to Mr. TREVELYAN,) Europe will read the Mahabharat, the Vedas and Puranas, unless your scheme of lithographing these works should fail to be carried into effect. Lithograph the Veda and you will gain immortal glory. If this enterprise, like the former, requires you to make some advances of funds, you may be convinced they will very soon be covered and more than that. Look to the Mahabharat ! Instead of 100 copies, lithograph twice that number. If you cannot do so for the Vedas, which I would bitterly regret, let us at all events have the Ramayana, the 18 puranas, the codes of Narada Vrihasputi, Vishnu, Saukhas Lekola, Shalashada. Yadma Valkya, with good commentaries on the great metaphysical treatises of *Vrimansa*, *Sankya*, *Vedanta Nyayaoan*, the rituals and the *Upanichada*, &c. &c.”

Extract of a letter from M. BURNOUF, dated 12th July, 1838.

“ M. JACQUET died the day before yesterday of a disease of the chest. He was but 28 years of age. This is a real loss : he was a highly informed, most sagacious man, well skilled in Sanskrita and Chinese. His illness scarcely abated his zeal. He was writing in fact half an hour before his death.



"We expect impatiently the arrival of the 3rd volume of the Mahabharat which, as I see with great pain, occasions you some pecuniary loss. We are taking every possible step to sell the work; in general there is a considerable demand for Sanskrit publications, provided they are ancient and complete. Still this demand is not equal to that for the Romances of Lord Byron, and I fear no one will make a fortune by Sanskrit impressions. But it would be painful to think that the little success of the Mahabharat should prevent your publishing other works, such as the Puranas, &c. &c. Send a prospectus with terms. We will obtain some subscribers, and when the work is completed, additional copies will doubtless be disposed of."

(Signed) EUGENE BURNOUR.

### Museum.

Read a letter from Mr. T. CHURCH, stating that the bows and arrows presented in his name by Mr. J. P. GRANT at a meeting of the Society held on the 1st August, were not from Penang, but from natives of the great *Andaman*.

Read a letter from Lieut. M. KITTOE, requesting to know the salary of the person employed by the Society to go with him in his survey of the *Raepur* road in the forests of Orissa, for the purpose of preparing specimens of Natural History for the Museum, and also applying for an advance of his salary for one month, which was paid by order of the President. The advance was sanctioned by the meeting.

Dr. O'SHAUGHNESSY stated that the specimen Malacca bell, presented by Mr. LEWIS at the last meeting, contained neither gold nor silver and was composed of tin and copper in the ordinary proportions of bell-metal.

Extract of a letter from C. B. GREENLAW, Esq. to the same, with remarks on the subject by Mr. McCLELLAND.

"Referring to the article at page 65 of the Asiatic Journal for January last, I some time since noticed to Mr. JAS. PRINSEP the existence within the volcanic belt in the map of what is called the swatch of no ground, which, by the late survey of the sea face of the *Sönderbuns*, which includes the northern part of the swatch, would appear to be in the form of a deep crater; and it would be interesting if its margin could be traced throughout its course, which I will ask Capt. LLOYD to do if he can. The purport, however, of my now writing is to send you a piece of rock just taken from the bottom of the H. C. barque *Amherst*, which, on her late passage from *Khouk Phyo*, struck on the *Terribles*, and brought away this piece. These rocks, the *Terribles*, are also within the belt marked in the map, and to my inexperienced judgment the rock seems to be of a peculiar character.

"With regard to the swatch, it would seem from a subsequent note to the one alluded to by Mr. GREENLAW (PRINSEP'S Journal, 1838, p. 369), that Capt. LLOYD has reason to suppose it is open to seaward. It is needless to say that any additional information that can be obtained regarding so peculiar a phenomenon in the geology of the coast, must possess the very highest degree of interest in a scientific point of view, and perhaps the best method of proceeding as occasions offer, would be to take soundings in different lines, so as to show the form of the basin and the inclinations of its sides.

"The specimen of rock from the *Terribles* is a sea green and rather soft sandstone, corresponding in appearance with a very common formation that skirts the base of some of the great mountain ranges in India; its surface is harder than its internal parts and of a brown color, deeply perforated by boring molluscs, and corroded by the action of the sea. One part of the mass has somewhat of a nodular or concretionary character, as if it had once been broken and reunited, but this may, probably be the effect of corrosion. Viewed under a magnifier, it is seen to be chiefly composed of angular granules of quartz, connected with greenish and black rounded particles, the whole being a little coarser than the deposits now forming at the head of the bay much nearer land. It is unquestionable therefore, that the *Terribles* are sedimentary deposits, that must have taken place at greater depths than the reef now



occupies. It is also certain, that unless there be some counteracting forces engaged, the action of the waves together with that of the boring shell-fishes (*Lithodomi* and a kind of *Teredo*) the danger of these rocks must be gradually diminishing. Hence the importance in a scientific point of view of the accurate surveys of this coast now in progress; for had such been made 100 years ago for instance, we should now be able to learn the relative changes that may have since taken place between the levels of the land and sea. No one knows any thing of the molluscs of the Bay of Bengal: we cannot therefore tell what animal it is that has perforated the fragment of rock thus accidentally brought away from the *Terribles* in the manner described, and which must aid the operations of the waves materially in breaking down this dangerous reef. I may take this opportunity of pointing out the identity of the perforations in the submerged reef with those that have been formed under similar circumstances in the sandstone of *Cherra Ponji*, and which may be seen in several specimens of the latter rock now in the museum. To illustrate this subject still farther, I may submit to the Society a sample of the work of a *Teredo* which rapidly devours trunks of trees and all woods that are cast on the shores of the Bay.

"This last specimen I received from Dr. CANTOR, the only naturalist who has paid the slightest attention, that I am aware of, to the molluscs of the Bay; the perforations in the wood are identical with those of the lithophagus teredo on the rock, though neither animal has yet been described, but we may perhaps consider the former to be the *Teredo navalis* or the *T. Clava*. Several similar animals are however known to inhabit the seas within the tropics; but the *fistulana* that perforate rocks, though in a geological point of view the most important of all, are not, I believe, known but by their perforations."

Extract of a letter, dated 7th November, 1838, from Captain G. C. ARMSTRONG to Mr. McCLELLAND, accompanying a box of minerals which are presented to the Society.

"This station is in 22° 36' N., and 86° 40' E., nearly surrounded by hills, at distances varying from 5 to 25 miles off. The soil in the cantonment, and to some distance is clay (from the decomposition of felspar), mixed with small fragments of quartz containing both iron and red oxide of manganese in large quantities; the surface is covered with a little vegetable mould.

"The hills west 5 miles off are formed of large boulders of greenstone and quartz; to the south granite, greenstone, cliukstone, and small portions of white marble; to the north mica slate in very large quantities, imbedded with schorl in aggregate crystals. In the *Roro* river and its vicinity, slate, limestone, jasper, quartz rock, and rock crystal are found." Capt. ARMSTRONG thinks there are also indications of coal in this part of *Singboom*. Coal, I may remark, has recently been observed by Dr. DUNBAR of the same corps on the way from *Ramgur* to *Hazareebaugh*, but it is probably that which was before observed by Mr. DRUMMOND of the latter place."

Read the subjoined Report by the Curator on several objects of natural history recently added to the Society's collection.

Skeleton of the long-lipped bear, *Ursus labiatus*, (BLAINVILLE.) *Bradypus ursinus*, (SHAW,) presented by the Curator, under whose supervision it has been prepared and artificially articulated for the museum.

Of the now several admitted subdivisions of the genus *ursus*, the present individual ranks as one, and forms a perfectly distinct species from any of the present known varieties; its geographical range being confined exclusively to continental India—at least we are warranted in so limiting its distribution, no accounts having as yet verified the existence of this animal in any of the tropical forests of the Indian archipelago, or in fact in any other parts of the globe—until future discoveries prove the contrary, it may therefore with propriety be regarded as one of the natural zoological productions peculiar to India proper; and were not the specific name '*labiatus*' so well applied as a systematic denomination in illustrating one of its most prominent distinguishing features, the employment of the topical name '*Indicus*' would, in my humble opinion, be much more appropriate than on the many ordinary occasions where it is given.

Although our animal may probably differ from those of cold climates in some minor points, it nevertheless possesses all the generic characters of the typical bears, and is the nondescript animal, and again the ursine sloth of early zoological writers.

This being the only skeleton of any kind of bear at present in the Society's collection, I am unable to make any comparative remarks, or trace out the specific peculiarities, if any exist, with regard to its ossific structure. The bones on the whole are strong and powerful; and though not yet arrived at maturity, as shewn by the still unconnected state of the epiphyses, they indicate by the full display of the large eminences and depressions for the origin and insertion of massive muscular levers, that the fabric belongs to an ungainly and thickset animal. Independent however of its clumsy appearance, the general contour exhibits a fine adjustment of its several parts to the well known peculiarities and habits of the living animal, while the structure and organization of the foot marks it as a type of the plantigrade order—in this respect differing—and offering a fine contrast to the more agile feline carnivora—which are again the types or representatives of the more perfect digitigrades, the toes only touching in the latter, while in the bears the whole heel rests perpetually upon the surface of the ground.

The dentary system is perfect in all its parts; the jaws containing six incisors above and below, the absence of which in the generality of crania which are transmitted to Europe, and which generally fall out at an early period of life, must have led to the error of associating the animal with the *Edentates* or Sloths. The series of well-defined tubercular molars, together with the anatomical structure of the stomach and alimentary canal, would seem better fitted for vegetable than animal matter, though I have no doubt this animal occasionally eats the latter; it is well known however, that bulbous roots, sugar-cane, and white ants, are the natural and principal food of this our Indian variety of bear.

It is to be regretted that the animal was received in a too advanced state of decomposition to admit of a very critical examination of its internal organization, much less of allowing the digestive apparatus to be preserved as specimens of comparative anatomy.

Antelope..... ? ..... Gazelle.

Presented by the late Mr. BELL, with the following short note, descriptive of its habits while in his possession.

"This (I suppose the real Gazelle) was as tame as a dog, jumping upon every one at table. We have had it as a domestic pet about a month, but could never hit upon its proper food. Grain it was indifferent about, and would hardly touch any thing but dates, dressed vegetables and roses, all which had a tendency to give it a bowel complaint: nevertheless it was recovering fast, when it unfortunately got into an enclosure where some large antelopes were kept, and was found bleeding about the abdomen. I fear it must have received some severe hurt from their horns. I now send it dead."—October 29th.

At present I have not been able to identify this delicate and graceful little animal with any of the recognized species of the group to which it evidently belongs.

The specimen is a young female, characterized by rudimentary horns, want of the usual development of the suborbital sinuses peculiar to the deer tribe, having tufts of hair below the knees and on the pasterns, possessing inguinal pores, two mammae, besides the other distinguishing marks on the face, ears and flanks, peculiar to the gazelline group; but on comparing these most prominent features with those assigned to the several species included under the gazelles in GRIFFITH'S translation of the *Régne animal*, it does not strictly accord in all of its specific or even in some of its subordinate characters with any one there described. I have consequently left it for future scrutiny rather than hazard an incorrect name.

As it is not known from what exact locality it was obtained, and the generic characters being less prominently set forth in the females of most animals than in the other sex, it must be reserved till we are fortunate enough to procure the male animal ere its place in systematic arrangement can be accurately determined. Its death appears to have been occasioned by swallowing a long piece of woollen yarn, as a large coil of this material was found in the cavity of the stomach, and which must have offered a mechanical resistance to any food passing on through the natural passages.

Stomach and cæcum of the above animal—the former showing the usual complicated digestive apparatus peculiar to the Ruminantia.

*Aquila Chrysaetos*. The ring-tailed Eagle (variety); presented by the curator and mounted in the museum.

This magnificent bird was shot by a native shikaree at *Tardu*, a village in the vicinity of the salt-water lake. It is a large and powerful raptorial bird, possessing all the distinguishing and characteristic traits ascribed to the true eagles; and though evidently an old bird, it becomes a highly interesting object for comparison with a young living bird, apparently of the same species, in the Society's compound,

and which with another bird, since escaped, was presented by Mr. HOMFRAY, of Calcutta, who reared them from nestlings.

*Noctua Cuculoides*. The cuckoo-owl, figured and described in GOULD's elaborate century of the Himalayan birds.

*Phœnicura leucocephala*. The white-headed Phœnicura, male and female.

*Charadrius pluvialis*. The Golden Plover, male and female.

*Chloropsis Malabaricus*. Malabar *Chloropsis*, (JARDINE and SELBY's Illustrations)—differing in some slight particulars (probably merely sexual) from the *Cyanopterus* of Nipal, a specimen of which was sent by Mr. HODGSON to the Society's museum, and again from a living variety now in the possession of the Curator, the habitat of which is *Monghir*.

*Cinnyris Gouldiæ*. GOULD's Sun-bird.

This beautiful little bird, which unfortunately is not a very good specimen, is named after the accomplished artist Mrs. GOULD, by whom the century is delineated, and is the only one of the kind in the Society's cabinet. It formed a part of Captain PEMBERTON's collection of birds from *Bootan*.

*Fuligula Rufina*. The Crested black pochard, male and female.

Replacing an inferior specimen of the male bird, already in the Society's museum.

*Mareca Pæcilorhynchus*. The Spotted-billed Wigeon male.

*Mareca* ..... ? ..... Wigeon. Unidentified for want of the male.

*Fuligula Caryophyllacea*. The Pink-necked duck. Replacing a bad specimen in the cabinet.

*Fulica Atra*. Common Coot, male and female.

*Macroramphus*..... ? ..... long beak.

Although only one species (the *M. Grisens*) of this genus appears to be known, neither the plumage of our present specimen or the one already occupying a place in the Society's museum and ticketed *Grisens*, and which are both alike, agree with its description. I therefore withhold the trivial name, until I am fully satisfied of its identity with *Grisens*, or find it to be what I suspect it is—a totally undescribed bird.

*Charadrius Arenaria*. Sanderling, male and female. Corresponding with specimens from *China*.

*Tringa*..... ? Sand-piper, male and female.

*Recurvirostra Avocetta*. Common Avocet.

A young bird of the first year procured from the Calcutta bazar, where they are occasionally brought with wild fowl.

*Columba Gouldiæ*. China-tipped Pigeon.

*Dacelo*..... ? Kingfisher.

Apparently an undescribed bird, brought by Dr. HELFER from the *Tenasserim* provinces, and found in woods in the interior perched upon high trees. The ground color of the bird is deep ferruginous, marked with broad transverse black bands. Bill and feet scarlet.

*Bucia Nipalensis*. Nipal Bucia, male.

*Falco Cærulescens*. Corulescent Hawk, from the *Tenasserim* provinces; only one met with near *Tavoy*. It is very bold and pursues small birds. The natives assured Dr. HELFER that it is equally distributed throughout the country.

*Dicurus Malabaricus*. Malabar Shrike.

*Cymberhynchus*..... ? Broad Bill,

from the *Tenasserim* provinces, and gregarious in the forests near *Tavoy*.

*Sciurus Macrourus*. Large-tailed Squirrel.

*Paradoxurus*—*Indicus*.

Cranium of the *Ovis Aries*—or *Patna* variety presented by the Curator.

The officiating Secretary presented the Report and documents of the Statistical Committee, and stated that the President of the Society was of opinion that it would be inexpedient to publish these papers in the separate form recommended by the Committee.

After some discussion, in which Dr. SPRY and Mr. EWART advocated publication in a separate form, the question was referred to the Committee of Papers.



*Meteorological Register, kept at the Assay Office, Calcutta, for the Month of November, 1838.*

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